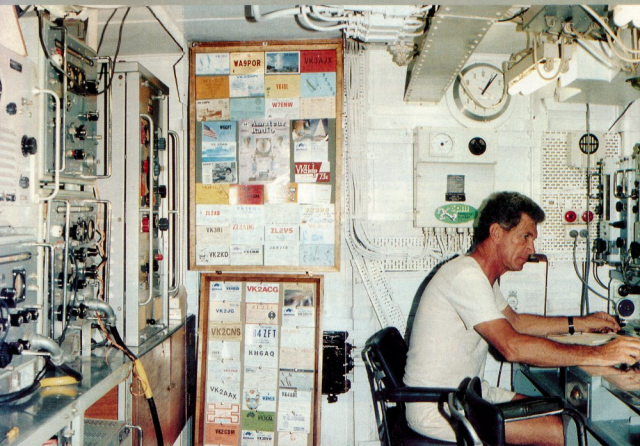


Amateur Radio



JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA
VOL 55, No 5, MAY 1987

International Travel Host Exchange
Photophones Revisited (conclusion)
Tune-Up Protection Device
Antenna for Space



COMM. RECEIVERS & SCANNERS

TEST INSTRUMENTS



NEW BRILLIANT NRD 525 COMM. RECEIVER FROM JRC

The new NRD 525 combines advanced performance and construction not seen on any other receiver.

Features: — Wide freq. range — HF 90 kHz to 39 MHz and optional VHF/UHF band — 200 channels memory & Scan reception — Triple reception (optional) — Direct access tuning — Wide dynamic range — Clock timer — Interface with PC

Simply The Best! only \$2299

FAMOUS AR 2002

\$949

World's most popular model

This unique scanner covers 25 to 550 MHz and 600 to 1500 MHz range. 2004 memories.

NEW — ANTENNA TUNER WITH LOW NOISE PREAMPLIFIER

ETP — 1 **\$159**

ETP-1 is an ideal accessory for all short wave receivers in the HF band. It tremendously improves the reception of weak stations!



ICOM IC-R71A MOST POPULAR RECEIVER ON THE MARKET

ICOM IC-R71A commercial receiver, one of the most popular receivers among short wave listeners. With 32 memories, keyboard entry, extremely high stability and superior performance makes R71A a highly respected radio!

\$1549

NEW KENWOOD R5000

Just Released \$1175

This latest addition to the respected Kenwood range of receivers is really unique. With 100 channels, keyboard entry, superb interference rejection and absolutely latest technology makes R5000 the best value on the market.

UNIQUE IC-R7000 \$1879



ICOM IC-R7000 is a top groove scanner, with 99 memories, keyboard entry and many other features making IC-R7000 an ideal monitoring device.

CODE CONVERTERS

For short wave listeners

In CW RTTY ASCII ASCII and FAX Mode!
To monitor marine, police, integral, weather, embassy, amateur and press services!

CD 670 High performance decoder for CW, RTTY, ASCII, ASCII, ASCII and ASCII **\$649**
CDR 660 CW RTTY ASCII TON ASCII Converter **\$499**
M 660 FAX Unique new radio Fax Converter — Ideal for marine, weather maps, professional communication **\$1039**
M 660 A unique highly professional decoder that does everything! **\$1399**

CB RADIO

Emtron Ace — Australia's most popular 40 CH general purpose hand held UHF CB transceiver



- Commercial & Professional Work
- Factory Management
- Working and Telling
- Building and Road Construction
- Boating
- Farming and Pastoral
- Crowd Control
- Construction Work
- General Service
- Surviving
- Personal Communication
- Security
- Business
- Mobile and Portable



UNIDEN

PC11 — 27 MHz AST **\$149**
AX144 — 27 MHz AM/SSB **\$339**
PC122 — 27 MHz AM/SSB **\$339**
Sunbreaker UHF CB mobile **\$339**
Sunbreaker UHF CB hand held **\$339**

ELECTROPHONE

TX472 — UHF CB mobile **\$479**
TX475 — UHF CB hand held **\$799**

ICOM

IC20 — UHF CB hand held **\$699**

VISIT OUR STORES FOR THE MOST COMPREHENSIVE SELECTION OF RADIO COMMUNICATION EQUIPMENT IN AUSTRALIA — COMMERCIAL, AMATEUR AND CB. THERE IS NO STORE LIKE EMTRONICS!

ANTENNAS:

Sophisticated 27 MHz base **\$69**
T1H34 27 MHz ee beam **\$139**
DA300 27 MHz to 1.3 GHz scanner ant **\$339**
AR500 active scanner ant **\$339**
AR7000 Scanner discase **\$229**

ANTENNA ROTATORS:

We stock all popular antenna rotators

KR 400 medium duty **\$339**
KR400RC medium duty 360° az **\$399**
KR400RC medium to heavy duty **\$499**
DR400RC heavy duty **\$499**
Crestle RC23 Heavy duty **\$499**
DAWA MR 750 medium to heavy **\$499**

CORRESPONDENCE: BOX K21, HAYMARKET, NSW, 2000

REGULATED POWER SUPPLIES

We stock Australia's largest selection of high quality regulated power supplies

DAIWA

PS100M — 3.15V, 10A **\$299**
PS100M — 3.15V, 10A **\$299**
PS100M — 3.15V, 10A **\$299**

ALINCO

EP-570 — 13.8V, 6A **\$230**
EP-510 — 13.8V, 15A **\$399**
EP-510 — 13.8V, 25A **\$439**
EP-3030 — 13.8V, 25A **\$439**

WELZ

RS3350 — 3.15V, 25A **\$399**
RS650 — 13.8V, 6A **\$199**

NEW

KIKUSUI 60 MHz-TRIPLE TRACE OSCILLOSCOPE — COS5060



Total Performance, multi-purpose. 3CH Multi Trace. Dome-mesh type 12KV P.D. CRT. A and B Alternate sweep. Hold-Off function. VERT. MADE trigger function. Energy-Saving design (PWT Pending). Designed for Laboratory. Production line, Maintenance and Field service use.

ONLY \$2660.00

INCLUDES 2 HIGH QUALITY PROBES

NEW GW 20 MHz, DUAL TRACE OSCILLOSCOPE

— GOS522

A heavy duty and accurate scope for service as well as production use. Features include:

- Wide freq. bandwidth
- Optimal sensitivity
- Extremely bright display
- Auto trigger level
- Variable hold-off
- Alternate triggering
- DC trigger coupling

\$855

Includes 2 high quality probes



10 MHz SINGLE CHANNEL CRO GOS-3310

\$454

- Smidley sensitivity
- Light & compact
- Easy to operate
- Low cost
- High performance
- TV sync mode
- Ideal for education, hobby and service work

5MHz OSCILLOSCOPE GOS-955

- Low cost
- High performance
- User friendly
- 100MHz Sensitivity
- Ideal for education, hobby and service

\$450

FREQUENCY COUNTERS

A whole range of top quality freq. counters at a

- GFC 8010F (120 MHz) **\$392**
- GFC 8055F (500 MHz) **\$669**
- GFC-8100G (16 Hz)
- Measurement centred
- High resolution
- Self diagnostic routine

\$839

GUC-210 UNIVERSAL COUNTER

\$568

— From 3 Hz to 100 MHz

— Frequency generated, f0/10, ratio and time interval



DIGITAL MULTIMETERS

CHECK OUR RANGE OF PROFESSIONAL MULTIMETERS

GDM-8135

- 6 Functions (AC/DC Voltage & Current Resistance & Diode)
- Test
- 20 digit
- High resolution, 0.1mV, 0.1uA
- 1000 accuracy, 0.1%

\$292

GDM-8135T

- 6 Functions (AC/DC Voltage & Current Resistance & Diode)
- 20 digit
- High resolution, 0.1mV, 0.1uA
- 1000 accuracy, 0.1%

\$373

GDM 8145 (GDM 8045)

- 6 Functions
- 4 digit
- High accuracy 0.20%
- High range — 1200V, 25A
- Auto zero
- True RMS

\$500

Escort EMT 1111A DIGITAL MULTIMETER



\$118

- High accuracy in measuring
- One relay range switch
- Fast and convenient operation
- Diode check, DC AC, 10A
- Instant continuity check
- Low battery indication
- 200 Hz only battery life
- Universal protection on all ranges
- Capacitor measuring
- Transistor hFE test
- 4 test drop guard display



\$91

- EDM-1105
- 3 1/2 digit LCD display
- Diode testing
- V DC 0.2-1000V, 5 ranges
- 1000 uA max resolution, 0.8%
- V AC 0.2-750V, 5 ranges
- 100 uA max resolution, 1.5%
- 2-4 max resolution, 1.5%
- A C 2-10 mA, 5 ranges
- 1 uA max resolution, 3%
- Ohm 200-20, 20 MΩ, 6 ranges
- 0.1 max resolution, 1.0%
- Auto zero & polarity indication

LCH METER Escort ELC 123 ANALOGUE MULTIMETERS — SOLID PERFORMER — BUILT IN BUZZER



\$264

- 10 digit LCD display
- Diode measuring ranges
- 3 capacity, 10, 100, 1000
- RANGES
- Capacitance 2000pF, 7 ranges
- 10 pF max resolution, 2%
- Inductance 2mH-200H, 6 ranges
- 0.1 uH max resolution, 2%
- Resistance 20-200M, 7 ranges
- 10M max resolution, 1%
- Accessories included: Test clips, spare fuse, instruction Manual

ANALOGUE MULTIMETERS SOLID PERFORMER — BUILT IN BUZZER



\$36

- Transistor checker
- Meter scale
- Peak & double pointer
- 20KΩ sensitivity
- V DC 0.1-10V, 25-10, 50, 250, 1000
- V AC 0.1-50V, 25-10, 50, 250, 1000
- Ohm R x1, R x10, R x100, R x1k, R x10k, R x100k
- Ohm 10k x 100, 50, 100, 250, 1000
- Ohm 10k x 100, 50, 100, 250, 1000



EMTRONICS

MAIL ORDERS WELCOME

NSW & HEAD OFFICE:

92-94 Wentworth Ave, Sydney
NSW, 2000. TLX:AA73990
P.O. Box K21 Haymarket, NSW, 2000.
Ph: (02) 211 0988
FAX: (02) 281 1508

VICTORIA:

288-294 Queen St, Melbourne
Vic. 3000.
Entrance from Lt. Lonsdale St.
Ph: (03) 67 8551 or 670 0330
FAX: (03) 670 0671

QUEENSLAND:

416 Logan Road, Stones Corner
Qld. 4120.
Ph: (07) 394 2555
FAX: (07) 349 4316

Amateur Radio



Davy VK4XX, doing the Sunday "shift" of VK4RAN in the W/T Office aboard the HMAS Diamantina.



See page 20



See page 41



See page 33

Special Features

Amateur Radio Plays a Part

- Eastern Zone Repeater Plays a Role in Rescue by Col Pomroy VK3BLE 41
- Cookie Cutter Rescue by Harold Tribe VK3AVH 41
- Beacons — Repeaters by Tim Mills VK2ZTM 20
- Centenary of Hertz's Birth of Wireless by Jim Linton VK3PC 31
- International Travel Host Exchange by Ash Nallawalla VK3CITZL4LM 3
- Morseword 2 by Audrey Ryan 46
- RNARS — Cover Story by Davy Inall VK4XX 20
- The Problem With DigiRepeaters reprinted from Amateur Satellite Report 61
- Vanuatu Tropical Cyclone AMU Disaster by Jim Linton VK3PC 36
- VK/ZL/Oceania DX Contest 1986 Results 35



See page 6



See page 3

Technical Features

- Building Blocks Revisited — Part 1 by Harold Hepburn VK3AFQ 4
- Classic Communications Equipment TR-AP-21-A Transceiver by Colin MacKinnon VK2DYM 22
- Great Circle Calculations on a Calculator by Ian Crompton VK5KIC 18
- Modified X-Beam for 20 Metres by John Moen VK2KA 10
- Novice Notes — Cheap Radio — The Junk Box by Drew Diamond VK3XU 27
- Omni-Directional Antenna for Space Communications by Joe Ellis VK4AGL 8
- Photophones Revisited — Conclusion by Mike Groth VK5AMG 13
- SADCG AX25-X3 Protocol for use in Amateur Packet Radio Part 2: by Steven Blanch VK2KFJ 42
- Simple Antenna Tuner by E C Brockbank VK2EZB 21
- Try This — Noise Bridge by Gil Sones VK3AU 19
- Tune-up Protection Device by Fred Piesse VK3BYW 6
- Want to Try RTTY? by Terry Morrison VK3RB 17



See page 31

Regular Features

Advertisers' Index	64
ALARA	51
AMSAT Australia	43
AR Showcase	49
— Icom IC-2A	49
— Icom IC-M55	49
— New Publications	49
— Packet Radio New Releases	49
Awards	49
— Arrhen Certificate	38
— Australian DXCC Ladder	38
— Crimson Crustacean Award	38
— Diploma Republica De Chile	38
— WIA 75 Award Recipient Updates	38
Club Portrait — Land Forces Amateur Radio Group	54
Contests	33
— Columbus Contest	33
— County Hunters SSB Contest	32
— Italian International Contest	33

— John Moyle in pictures	33
— Utah QSO Party	32
— VK Novice Contest 1987 — Rules	32
— VK/ZL/Oceania DX Contest (1986 overseas results)	35
Editor's Comment — Are you one of a thousand?	2
Education Notes —	61
Electro-Magnetic Compatibility Report —	39
Equal Duties, Equal Rights	39
Five-Eighth Wave	57
Hamads	64
How's DX	28
International News	26
Intruder Watch	40
Ionospheric Predictions	63
Listening Around	46
Novice Notes — Cheap Radio, the junk box	27
Obituaries — Bill Deague, Alf Gover, Bob Jordan, Bob Smith, Bob Blyth	62

Over to you! — members have their say	60
Pounding Brass	47
QSP	10, 12, 30, 36, 38, 39, 40, 48, 51, 57, 59
Silent Keys — VK2BQD, VK5NQF & VK2BIZ	62
Solar Geophysical Summary	62
Spotlight on SWLing	45
Try This — Noise Bridge	19
VHF UHF — an expanding world	24
VK2 Mini-Bulletin	52
VK3 WIA Notes	57
VK4 WIA Notes	58
WICEN NOTES — Exercise Southern Link by Paul Walton VK3PW	40

DEADLINE

All copy for inclusion in the July 1987 issue of Amateur Radio, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9 am, May 22, 1987.

Amateur Radio



Editor's Comment

ARE YOU ONE OF A THOUSAND?

What is the Wireless Institute worth to you? Something like one thousand who were members last year have not renewed their membership this year. Do we assume their answer to the question is "Less than the subscription you want us to pay"?

If you are one of that thousand, you are only able to read this by courtesy of a club or another amateur whose membership is still current. I hope you still have sufficient interest in the present and future of amateur radio to have made at least an effort to see this issue. Those of you who gave reasons for resignation or non-renewal invariably said the COST was more than they could afford. No one indicated disapproval of the Institute's activities or policies, simply the cost.

We have had threats from some, who are displeased with this action or that policy, that they will resign as a result. They have renewed their membership, because as people who THINK about the future of our hobby they know that without the Institute that future could only be described as dim! They know that they can have more influence on the Institute and its activities from within. They have thought about a future in which there is no WIA, and decided they prefer this Institute to no Institute.

Is it really so, that the WIA could cease to exist as a result of a few (?) resignations? Do you, who have left us, think that we will continue as before in your absence? We are faced with the same financial problems that you are. Subscriptions have to be raised because all our expenses are rising too. In spite of the most stringent economies, and the extent to which we are run by unpaid

volunteers, the costs of producing this magazine continue to rise. Many of these costs are unaltered, whether we produce one copy or ten thousand. Every member who leaves places a heavier burden on those who remain.

Several members have told us they would like AR to carry more information and reporting of Institute management — committee meetings, convention agenda and debate, etc. To some extent that could be done, if we had more space. It would need a larger, more expensive magazine.

Because of cost pressures, DOC has been directed to stop administering the amateur certificate examinations. Devolution is the word. The WIA is the logical body to take over that responsibility. It may be possible for the WIA to do it at less cost to candidates than applies now. If falling membership renders the WIA less representative and less viable, the commercial educational alternative will unavoidably cost more.

Does the WIA provide value for money? Do you belong to a sporting club, or an association of people who share your interest in gardening, drama, photography, or whatever? What are their current subscription rates? Are you really so broke that you can't afford the WIA? If so, you can't afford to be a radio amateur! At least, a strong Institute ensures that the opportunity is still there. Without the WIA and its sister societies the hobby of amateur radio could be finished. Do you really want to help that to happen?

Bill Rice VK3ABP
Editor

Published monthly as the Official Journal by the Wireless Institute of Australia, founded 1910, ISSN 0002 — 6665
Registered Office: 3105 Hawthorn Road, Caulfield North, Vic. 3161. Telephone: (03) 528 5962.

EDITOR

BILL RICE*

VK3ABP

TECHNICAL EDITORS

PETER GAMBLE*
PETER GIBSON*
EVAN JARMAN*
DOUG MCARTHUR*
GIL SONES*

VK3YRP
VK3AZL
VK3JANI
VK3JUM
VK3AJU

CONTRIBUTING EDITORS

Brenda Edmonds
Ron Fisher*
Gilbert Griffith
Ken Hall
Roy Hartkopf
Robin Harwood
Ron Henderson
Ian Hunt
Colin Hurst
Eric Jamieson
Bill Martin
Ken McLachlan
Len Poynter*
Hans Ruckert

VK3KT
VK3COM
VK3CGG
VK3AOH
VK3RTH
VK3RTH
VK3SHI
VK3SLP
VK3COP
VK3AH
VK3BYE
VK3AOU

DRAFTING

George Brooks
Liz Kline

*Members of Publications Committee

Inquiries and material to:
The Editor,
PO Box 300,
Caulfield South, Vic. 3162.

Material should be sent direct to PO Box 300, Caulfield South, Vic. 3162, by the 20th day of the second month preceding publication. Note: Some months are a few days earlier due to the way the days fall. Check page 1 for deadline dates. Phone: (03) 528 5962.

HAMADS should be sent direct to the same address, by the same date.

Acknowledgment may not be made unless specifically requested. All important items should be sent by Certified Mail. The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying a reason.

TRADE PRACTICES ACT

It is impossible for us to ensure the advertisers submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that, the provisions of the Act are complied with strictly.

VICTORIAN CONSUMER AFFAIRS ACT

All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the box-holder or seller of the goods.

Production: BETKEN PRODUCTIONS

5 Masfield Avenue, Mooroolbark, Vic. 3138.
FAX: (03) 726 7059

Laser Scanned Colour Separations by: QUADRICOLOR INTERNATIONAL (AUSTRALIA) PTY LTD

3 Lake Drive, Dingley, Vic. 3172.
Tel: (03) 551 3333

Typesetting by: BETKEN PRODUCTIONS

5 Masfield Avenue, Mooroolbark, Vic. 3138.

Magazine Make up and Photo Reproduction by: EASTERN ADVERTISING PTY LTD

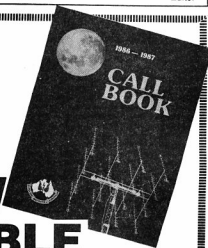
248 John Street, Lilydale, Vic. 3149
Tel: (03) 735 5410

Photographic Film and Processing Material courtesy: AGFA-GEVAERT LTD AUSTRALIA

Printed by: LEADER WESTERNPORT PRINTING PTY LTD
1 University Place, Clayton North, Vic. 3168.
Tel: (03) 560 5111.

Mail Processing by: AUTOMAIL PTY LTD

14 Stamford Road, Oakleigh East, Vic. 3166.
Tel: (03) 568 6677



NOW AVAILABLE
THE 1986-87 WIA CALL BOOK IS NOW AVAILABLE FROM DIVISIONAL OFFICES.

PRICE: \$6.50 plus post and packing

INTERNATIONAL TRAVEL HOST EXCHANGE

Are Amateurs Inhospitable?

Ash Nallawalla VK3CIT/ZL4LM
PO Box 539, Werribee, Vic. 3030

The International Travel Host Exchange (ITHE) is a voluntary scheme founded in 1984 by the ARRL Board of Directors to promote international goodwill and friendship. The ARRL and other interested sister societies maintain a file of amateurs interested in participating in the scheme.

From left: Ash G0/ZL4LM, Lesley VK3PZA and Roger G3LQR

In Australia it is represented by the WIA. The scheme merely consists of a list of names and addresses of amateurs who have indicated their willingness to meet visiting overseas amateurs and their families; to show them around; and, if possible, to accommodate them for a few nights, or exchange vacations with amateurs of other countries. The original intention of the scheme was to arrange house swaps, but this did not appear to be popular. Today the scope of the scheme has been widened to appeal to more participants. This article examines the scheme and provides some guidelines as viewed by a participant.

ARE WE INHOSPITABLE?

In 1986, the number of participants was just one each in Australia and New Zealand (a VK1 and an amateur couple in NZ). Are we really so inhospitable, or would we have volunteered had we known more about the scheme? I suspect that the latter is the case. I have lived in, or visited, at least five countries where eyeball contacts or stays with local amateurs have made the visit more enjoyable. There is no doubt that most of us would enjoy meeting other amateurs, particularly those from other parts of the world. I am sure many of us have a spare bed or two, and that we can afford the expense of feeding extra mouths for a few days a year.

DO WE NEED SUCH A SCHEME?

Many amateurs get the opportunity to travel overseas for business or pleasure, and a few manage to prearrange a meeting with an amateur at their destination, usually due to a long on-air friendship. However, there must be many other travellers who do not have HF privileges or do not know overseas amateurs. Some amateurs defer an overseas trip possibly because they could only afford to pay for the fares but not hotels. Even if one could afford to take a first-class conducted tour, it would not be the same as being entertained by locals not involved with the hospitality industry, particularly by those who share our hobby.

The ITHE scheme merely formalises something that has existed unofficially, and creates new opportunities for many more people. We can all play our part in enjoying this comradeship whether we are able to travel or not. The scheme does not involve a reciprocal commitment. Amateurs not on the list can contact a participant and get exactly the same treatment as someone who is also on the list. Conversely, someone on the list may never be able to travel. The more names we have on the list, the lesser is the burden (albeit pleasant) on the existing participants. Perhaps, one day the scheme will become so popular that, instead of appearing on a list, a participant will be denoted by an asterisk against his/her call book entry.

With our Bi-centennial year not too far away, I would like many more of us to register with ITHE and invite overseas amateurs "down under." They

might as well see New Zealand whilst they are in the neighbourhood. As a citizen of both countries I would like to promote both! I think we are helping the tourism industry because we may attract some who could not otherwise afford to come, and most visitors would combine some paid accommodation or a conducted tour with the ITHE scheme.

HOW TO VOLUNTEER

The WIA Federal Office will supply application forms upon request (SASE appreciated). The information requested consists of your name, address, telephone number, languages spoken, whether you wish to meet a visitor and/or whether you can provide accommodation. This information is forwarded to the ARRL which maintains the master-list and supplies a copy thereof to the WIA and other IARU members. The rest is up to the participants and their guests.

GUIDELINES FOR HOSTS

After your name is listed, you may be contacted by a prospective visitor. If the dates of the visit do not suit you, you should not hesitate to say so. If you can be of assistance you should provide all relevant information that will avoid later embarrassment, eg do you charge for accommodation (if you operate a motel), are you handy to public transport, can you pick them up at the airport, do you plan to show them some sights (if not, they could pre-book local sightseeing), what is your family composition (so that they may bring suitable little gifts), what type of accommodation can you provide (is it sleeping bags in the shed or a double bed and ensuite?), etc. Remember, you should only offer to do what suits your bank balance and schedule, bearing in mind that you may wish to entertain other such visitors each year. Do not expect your visitors to spend all their time in your company, as they are not coming only to meet you. You will probably see them briefly at breakfast and late at night, but you can offer to host at least one special meal, say, a barbecue with some local amateurs? You can also help with arranging reciprocal licenses and perhaps by lending the guest a hand-held unit.

GUIDELINES FOR GUESTS

The WIA Federal Office will provide members intending to visit a particular country or region a copy of the relevant part of the list. A prospective guest should aim to cause the host the least possible inconvenience or expense. Do not forget to provide all relevant details when making initial contact, eg dietary restrictions, your proposed itinerary, etc. Keep your children under control, and do not presume to have permission to smoke in the host's home or car. If you are lucky, you may be given a key to the house; if not, do not expect the host to wait for you past a reasonable time. You should pay (or offer to) for admission charges to tourist attractions, petrol, food, etc, especially if your host is providing accommodation. Do not take the offer of "Make yourselves at home" too literally — you may be a "slob" and not know it!

For example, some people do not bathe daily, and others may find this distasteful. Go out of your way to provide a very favourable image of your country-folk, or else the host may write off Australians as a bad risk.

NOW FOR THE BAD NEWS

Any amateur can be a guest of an ITHE participant, but the scheme should not be abused. There is no vetting of either guests or hosts, so an element of risk exists. We tend to assume that other amateurs are as honest, as agreeable, or as clean as us. This is generally true, but there is always the exception. Be aware of cultural differences that could be mistaken for rudeness or ill manners. A person accustomed to having servants to do the dishes may not volunteer to help the host; in some countries the use of table linen such as "please" or "thank you" is not mandatory and is reserved for formal situations. Your hosts may also have disagreeable traits, so you will have to take them as they come.

OUR TRIP

The following account is provided by way of example only, and does not purport to be the right way to be a participant. My wife, Lesley VK3PZA, and I visited the UK and Holland last Christmas, partly to promote my book *Better Radio/TV Reception* at the BBC and Radio Nederland, and partly to have a holiday. I do not have an efficient HF setup, so I did not have any existing amateur friends there. We telephoned Roger G3LQR, an ITHE participant who lives near London, to introduce ourselves and he immediately offered to accommodate us for as long as necessary. We wanted to accept his offer for the first seven nights, take an eight day coach tour, and spend our last two nights in London so as not to bother him. He would not hear of this, due to the high cost of London hotels, and insisted that we spend the last two nights with him. Upon arrival at Heathrow, we were asked to meet him at Hammersmith, whence we were driven to his Surrey home. As gifts, we took some souvenirs, macadamia nuts (very popular), and some duty free Australian rum. We also treated him firmly to a show in Drury Lane. I used his station and my G0/ZL4LM call sign to explore the HF and VHF bands. He took us out for a meal one evening. We felt guilty seeing little of him, but he put us at ease saying that we were there to see Britain, not him. We endeavoured to eat out as often as possible and bought a few groceries to help out. We not only saved perhaps \$1000 on accommodation, but we experienced some warm British hospitality and made new friends. Needless to say, we have also registered with the ITHE. We hope we too can make someone else's visit just as enjoyable as ours.

BUILDING BLOCKS REVISITED

Part One

Harold Hepburn VK3AFQ

4 Elizabeth Street, Brighton, Vic. 3186

Whatever the end objective of the constructor each module could be made as and when time, inclination and money was available. Printed circuit boards for the project were sold through the VK3 Division of the WIA and were available up until the late 1970s, when it became apparent that home-brewing was in a decline (hopefully a temporary one) and their supply was discontinued.

Recently there has been a decided upswing in inquiries for boards for the 1975 project and this, together with the rapid price increases of commercial equipment brought on by the decline of the Australian dollar, led to the belief that the time might be opportune to update the original concept.

This series of articles will therefore describe ten modules, each which has a "stand alone" use in an amateur context and which, in combination, can make a single band HF SSB/CW transceiver with an output of 40 watts PEP. If a transceiver is the end objective, then the modules needed for the receiver can be made first and the necessary additions to expand the receiver into a transceiver made later.

It should be noted that this series of articles will deal only with the HF equipment, up to 30

Some 12 years ago, the writer described in *Amateur Radio*, a series of modules or building blocks which could be used to make anything from a simple VHF FM receiver to a single HF transceiver with a digital readout.

MHz. The VHF modules will be described by John Day VK3ZJF. John and the writer have collaborated at all times to ensure that both the HF and VHF modules are compatible in both physical size and electrical detail as to feed levels, etc.

DISCUSSION

Before any detailed design could commence a few supply and cost difficulties had to be

solved. The current cost of IF filters into the hands of the end user varies between \$A160 and \$A250, depending on the source and specification. No problems, if you already have one in the junk box, but a bit off-putting if you are not that fortunate.

Good quality tuning capacitors suitable for use in a VFO are likewise very difficult to obtain and are prohibitively expensive when they are located. Even if a source of tuning capacitors could be found, the final problem appeared insoluble. No source could be found at all for the mechanical drive mechanism to drive the VFO capacitor. Again junk box possession of a suitable dial drive makes the owner a lucky person but such possession cannot be assumed in articles of this ilk.

The virtual disappearance and/or high cost of key components for amateur constructors is not surprising. Once the amateur switched their favours to complete commercial equipment, the component market ceased to be attractive to manufacturers and, understandably, they directed their efforts elsewhere.

In the event, practical solutions for all of these problems were found.

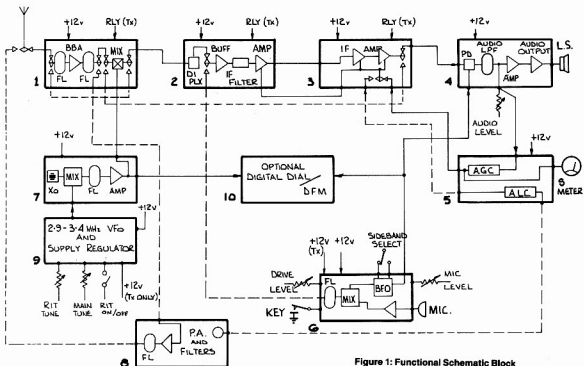


Figure 1: Functional Schematic Block Diagram.

The high cost of IF filters was avoided by making use of the ready availability of low cost computer crystals and using them in a ladder — not lattice — configuration. The way to do this was pioneered by J A Hardcastle G3JIR, in a series of articles in *Radio Communications*, the house magazine of the RSGB. The most important of these articles was in the February 1979 issue of RADCOR, but prior articles in the December 1976 and January 1978 issues, contained additional practical information. It will be shown later, that the cost of a suitable filter can be brought down to around \$A15-20, if tackled properly.

The problem of tuning capacitors and their associated drives was avoided by using voltage tuning of a varactor diode, together with a ten turn potentiometer and an associated multistage. This latter device is a mechanical reduction drive with a numerical read out and is widely used in professional electronic equipment other than radio gear. The particular device used is available in Australia and — for a tuning range of 500 kHz it gives a readout to 1 kHz. The tuning rate approximates to 50 kHz per turn.

Having found a way round the basic problems, it became possible to design a series of modules which had "stand alone" uses but were capable of being combined into single band SSB/CW receivers, transmitters or transceivers.

All components and devices used in the modules described in these articles are current in use items and are all obtainable in Australia. Where availability from the local corner store is suspect, specific suppliers will be named.

FUNCTIONAL DESCRIPTION

Detailed circuitry will be given for each module as the articles progress, but a functional description of each part of the system is appropriate at this stage.

Figure 1, is a block diagram which shows the complete system that consists of ten modules. The modules numbered one to eight are each contained on a 6 by 1.5 inch (153 x 38 mm) single sided circuit board. Module 9 — the VFO and its associated voltage regulator consists of two 3 x 1.8 inch (76 x 46 mm) single sided PCBs which fit into a diecast box. Module 10, the readout/DFM, consists of two 6 x 1.5 inch (153 x 38 mm) single sided PCBs according to the degree of complexity chosen.

MODULE ONE

This board contains two two-pole bandpass filters on the chosen signal frequency, a broadband amplifier and a double balanced diode mixer.

In the receive mode, the incoming signal passes first through one two-pole filter section, is amplified by the broadband amplifier, goes through the second two-pole filter section and then into the mixer. Injection input from Board 7, combines with the amplified and filtered signal, to give an output at the IF frequency of 8 MHz.

In the transmit mode the mixer takes an 8 MHz SSB/CW input from Board 3 and also from the VFO chain. The mixer output, now on the signal frequency, is filtered and amplified by the other components on the board. The connection changes necessary to go between receive and transmit, are done with miniature relays.

MODULE TWO

This board contains a receive only diplexer, a pre-filter matching stage, a six-pole ladder filter centred on 8 MHz and a post-filter IF amplifier.

When in the receive mode the diplexer ensures that a 50 ohm load is presented to the mixer on Board 1, at all of the unwanted mixer outputs. The pre-filter stage presents a 50 ohm load to the mixer on Board 1 at the IF of 8 MHz and the appropriate (around 200/300 ohm) load to the ladder filter. The filter has a bandwidth of around 2700 Hz. The gain of the post filter IF amplifier is AGC controlled.

In the transmit mode, the diplexer is not used. The 8 MHz double sideband from Board 7 goes through the matching stage, is stripped of the unwanted sideband and the resultant SSB is amplified in the post filter stage. This time however, the gain of the post amplifier stage is controlled by an ALC voltage derived from Boards 5 and 8.

In both modes, the output of the board goes to the IF amplifier. Again, change over functions are done with miniature relays.

MODULE THREE

This board uses two 8 MHz amplifier stages. They are used for both reception and transmission. When receiving, the gain of the stages is AGC controlled whilst the transmitting stage gain is ALC controlled. When receiving, the output of the board goes to the product detector on Board 4. When in the transmitting mode, the output is steered to the mixer on Board 1. Miniature relays are again used to do the necessary change-overs.

MODULE FOUR

This module is used only for reception. The board contains a passive doubly balanced product detector, an audio low pass filter with a fairly steep roll off starting around 2.6 kHz, a low gain audio preamplifier and an audio output power stage. The output stage generates between 2.5 and 4.5 watts of audio output, depending on load impedance and supply voltage.

MODULE FIVE

This board contains the circuitry necessary to generate an audio derived AGC voltage for reception and an RF derived voltage for transmitting purposes.

A simple S-meter system is also on-board with the meter being relay switched, to provide an indication of output when transmitting.

MODULE SIX

This board contains a crystal controlled BFO (with selectable sideband facility), a microphone amplifier and an active doubly balanced modulator operating at 8 MHz. The BFO is, of course, used for both reception and transmission, but the microphone amplifier and DBM are only used when transmitting.

MODULE SEVEN

This is the injection mixer board. It is required for both reception and transmission.

The board contains a crystal oscillator whose output is combined in an active doubly balanced mixer with the output from the VFO on Board 9. The required output product is selected with a two-pole bandpass filter. A wideband amplifier follows the filter to raise the level to the 10 mW required by the RX/TX mixer on Board 1.

MODULE EIGHT

This board is used only for transmitting purposes. It contains the stages required to raise the signal output from Board 1 to around 40 watts PER. An output signal filter is also on the board.

MODULE NINE

This module is used for both reception and transmission. It comprises two "half-sized" boards. One board holds the varactor tuned VFO proper, whilst the second holds the circuitry necessary to provide a very stable, ripple free, source of DC for both the VFO itself and for the supply to the tuning diode.

The main tuning potentiometer, the RIT potentiometer, an RIT ON/OFF switch and an RIT indicator LED, together with the two PCBs, are all housed in a diecast box.

MODULE TEN

The boards comprising this module provide a purely optional extra in the format of a digital readout of operating frequency. When used for this purpose, outputs are taken from the BFO and from the injection mixer board. These two signals are combined, filtered and divided down to give an output which is one-tenth of the signal frequency. This one-tenth signal is used as input to a LSI counter chip which drives a six digit display. If desired, a third board allows external signals up to 50 MHz to be processed and presented to the LSI counter section, thus becoming a self contained digital frequency meter.

A detailed description of the various modules will commence in the next issue of *Amateur Radio*.

TEGA ELECTRONICS

SPECIALISTS IN RADIO FREQUENCY, COMMUNICATIONS TEST EQUIPMENT COMPUTERS

CATERING FOR AMATEUR, COMMERCIAL, GOVERNMENT

Call in at:
**75 Grand Boulevard,
Montmency Vic. 3094**
or phone:
(03) 431 1153
Terry and Gary (VK3ZHP)

AMRA/1

A TUNE-UP PROTECTION DEVICE



FRED PIESSE VK3BYW
61 Munro Street, East Kew, Vic. 3102

The need for such a device arose several years ago when the final transistors were damaged in an early model IC-701 transceiver, whilst attempting to match a random length of wire for an antenna at a bush camp.

SWG enamel covered wire and the secondary is 10 turns of 24 SWG wire.

Keep the RF leads short. I was able to mount the transformer by its pigtails only between the SO239 dummy load socket and a lug on the rotary DPDT switch as shown in the photographs of the unit.

Precision of the Wheatstone bridge depends on the accuracy of the 50 ohm resistors used. In my case, 50 ohms stock was not available so two 100 ohms in parallel were used in each 'leg' of the bridge.

A handful of 100 ohm resistors were checked with a good digital Ohm Meter and it was found that the rejection ratio of one watt stock was surprisingly low. Six of these, accurate to two decimal places, were used. The combined rating of each pair of bridge resistors should be half a watt, or more.

The 0-50 μ A meter used in the unit is not calibrated in VSWR values. A table which relates meter scale readings with approximate SWR values is shown in Table 1. The meter scale is linear, but the bridge circuit is not. However, it is near enough for the purpose. The table can be used to mark SWR points on an existing scale or for a replacement one.

Subsequently, I replaced this unit with a current model "top of the line" transceiver and my fear of damage occurring during tune-up was not dispelled when I read in its instruction manual: "As the output is quite high, avoid connecting the antenna connector to open lines and do not transmit under mismatched conditions. Otherwise the final stage could be overloaded and cause a malfunction of the unit", and also, "The final transistors used in the IC-751 are of good design and are protected to a reasonable extent by circuits incorporated in the set". Further, under the same heading: "When in doubt about antenna systems, use the lowest power settings to achieve meaningful readings. Use a good tuner or transmatch when necessary. Always use caution and exercise judgment when testing RF power generators".

I endeavoured to purchase a commercial unit which would provide the protection that I

needed, but without success, so I built a device which works well and gives me peace-of-mind whenever I need to use an Antenna Matching Unit.

It is an adaption of an SWR bridge. Extra circuitry enables the transceiver to operate directly into a dummy load during adjustment of the AMU. The small amount of voltage needed to excite the bridge is derived by means of an RF transformer from the dummy load line.

If, for any reason, the antenna load cannot be properly matched, the transceiver will not shutdown or be damaged while it operates into a dummy load.

The RF transformer is wound on a $\frac{1}{2}$ " (12 mm) diameter toroid core (Amidon T50-6), and mounted on a small piece of matrix board through which the pigtails can be threaded. It is coated with epoxy resin to hold the windings in place. The primary winding has two turns of 20

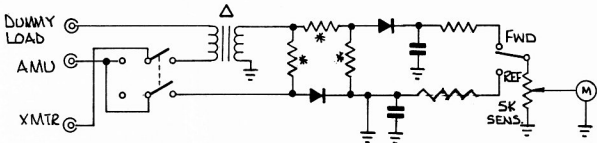
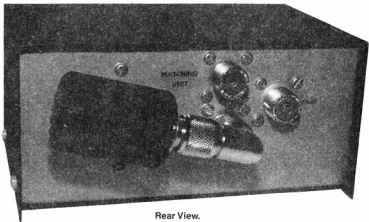
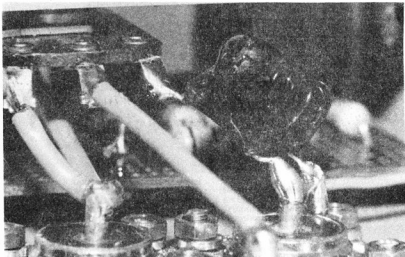


Figure 1: Schematic Diagram and Parts List.

Δ RF Transformer — see text
X Bridge Resistors — see text
Other Resistors — 4.7 k half-watt
Capacitors — 0.002 ceramic
Diodes — general purpose germanium
OA90, OA95
Meter — DC 0-50 μ A



Rear View.



Internal Views.

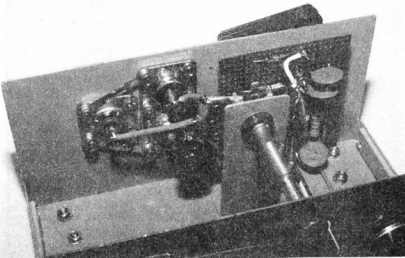


Table 1.

SCALE READING	VSWR VALUE
0	1.0
2.38	1.1
4.55	1.2
6.52	1.3
8.33	1.4
10	1.5
11.54	1.6
12.96	1.7
14.28	1.8
15.5	1.9
16.67	2.0
21.4	2.5
25	3.0

For SWR values exceeding three, use the formula:

$$VSWR = \frac{(50 + X)}{(50 - X)}$$

where X is the reverse scale reading.

This unit will simplify tune-up of transmitters with valve finals as the matching unit can be adjusted independently of the transmitter controls. QRM caused by strong carrier signals will be reduced during tune-up periods. The strength of the signal with this device in use is very low and will not move the needle of my in-line power meter even when set for maximum sensitivity.

The unit is shown with a detachable dummy load which saves lugging the heavy station unit when operating mobile.

It is housed in a home-made box measuring 160 x 90 x 75 mm (WDH) and is finished in Auto-Spray Touch-Up Paint.

It is easy to build, low in cost, and has dispelled any fear of damage to my equipment.



A Call to all
Holders of a

NOVICE LICENCE

Now you have joined the ranks of
amateur radio, why not extend
your activities?

THE WIRELESS INSTITUTE OF
AUSTRALIA
(N.S.W. DIVISION)

conducts a Bridging Correspondence
Course for the AOCF and LAOCF
Examinations

Throughout the Course, your papers
are checked and commented upon
to lead you to a **SUCCESSFUL
CONCLUSION.**

For further details write to:

THE COURSE SUPERVISOR
W.I.A.

PO BOX 1066
PARRAMATTA, NSW, 2150

(109 Wigram Street, Parramatta)

Phone: (02) 689 2417

11 am to 2 pm M to F and 7 to 9 pm Wed

AR56

Omni-Directional Antenna for Space Communication

Joe Ellis VK4AGL

Burnside Road, Nambour, Qld. 4560

This article describes a Dual Slanted Vertical unit suitable for communicating with satellites.

ONE OF THE factors that keep Australian amateurs from participating in satellite communication is the high cost of rotatable antennas. The main cost is the motors that take care of changes in elevation and azimuth. A pair of motors or a composite motor will cost about \$600 or more and when the cost of high-grade coaxial and control cables is added, a considerable amount of money has been out-layed.

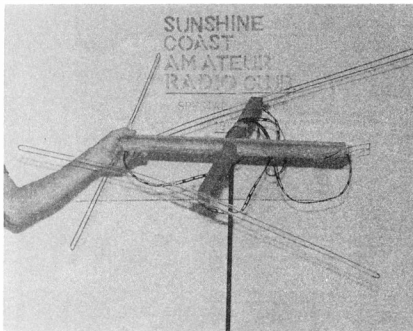
The writer began with simple turnstile antennas which consisted of a pair of halfwave dipoles at right angles to each other, fed 90 degrees out of phase and mounted a critical distance above a reflecting surface. This device has some drawbacks although it is a popular concept on spacecraft. OSCAR-12 (JAS-1) is equipped with two canted turnstiles on 435 MHz. I then progressed to long-boom crossed Yagis, custom-built to my requirements and added new motors, better grade coaxial cable and heavy duty control cables.

This is okay if you have a thousand dollars burning a hole in your pocket.

With OSCAR-10, my main preoccupation, off air due to cosmic radiation damage to its central computer system, I have lately had spare time to play about with simple, but elegant, omni-directional arrangements such as the *Lindenblad Array*. The one that is described here is a dual slanted vertical unit. Once again, this approach is popular with the spacecraft designers and a slanted vertical for 145 MHz is part of OSCAR-12. It might be rewarding at this stage to outline what we are attempting to achieve in the design of an antenna suitable for communicating with spacecraft.

Basically we know that a radio wave is composed of electric and magnetic fields of which the former is of most concern to us.

These fields are normally separated by 90 degrees of phase. By convention, if the electric field is vertical with respect to ground, it is vertically polarised. Similarly, if this field is horizontal to ground, it is considered horizontally polarised. Vertical polarisation is used in mobile work and for contact with repeaters, etc at VHF frequencies whereas horizontal fields are popular with attempts at long-range VHF/UHF in simplex mode.



In earth-based communication, generally speaking, the magnitude of the electric field varies but does not rotate about its axis and we call it linear polarisation. With space communication we use circular polarisation to access the spacecraft, designing our antenna systems

to rotate the electric field about its axis. In any case, our radio transmission will commence to rotate as the wave-front collides with electrons, the earth's magnetic field and elements of hydrogen and oxygen.

The phenomenon is known as *Faraday*

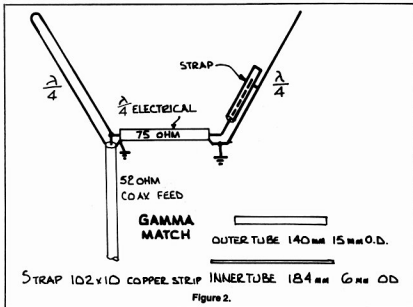


Figure 1.

Figure 2.

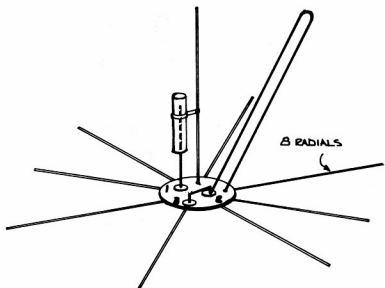


Figure 2a: Physical Layout.
Phasing Line between 1 and 2.
Coaxial Feed to 3.

Rotation. The main thing to remember is that maximum transfer of energy to and from a spacecraft will occur when we match its polarisation. We also want our antenna to perform well at the horizon with a gradual decrease in performance as we elevate to directly above our QTH where the spacecraft is at its closest. In the case of OSCAR-12 — 1500 kilometres.

Let us look at Figure 1. The dotted lines show the vertical plane pattern of a quarter-wave vertical and the solid line shows the same radiator offset 45 degrees. It can be seen that the null above the antenna has been filled in. The other thing that happens is that the usual impedance drops from around 37 ohms to 21 ohms — no worries, we will sort that out later!

The next step is to add another offset radiator driving it 90 degrees out of phase and generating circular polarisation. Shock, horror — to find that it is circular only directly overhead and rapidly degenerates into an elliptical form as we descend to the horizon where, in fact, it becomes linear. It is a relief to learn that most radio waves arriving from spacecraft tend to be elliptically polarised. Linear polarisation enables us to use the antenna for repeater work, as well. In fact, this device works extremely well on the out of town repeaters. Worthwhile giving it a try? Okay, let's get to work!

The first step is to get yourself a piece of galvanised gutter flashing and cut a circle 152 mm in diameter. Next, acquire some three millimetre copper earth wire from your local electrical or telegraphic authorities. The wire the writer acquired was badly twisted and bent and this was straightened by gently pulling it with his old tractor. (Feel free to use your Turbo-Sports or any other way!)

With a chassis punch cut three holes suitable for SO239 UHF fittings and pop-rivet these in place. (I placed these in a triangle, 50 mm apart).

Dale VK4GSX, offered a number of options and I chose to use a vertical radiator on one side and a folded dipole on the other to simplify the object mechanically and from a feed point of view.

The vertical radiator is prepared next. Cut it 518 mm long. Bore a hole in the plate alongside one of the SO239 fittings. Allow only 493 mm to protrude above the plate and solder it in place.

A gamma match is made by following the diagram in Figure 2. Attach as shown and bend the whole assembly 30 degrees away from the vertical. We are using 30 degrees here for reasons of matching ease.

Next, prepare the folded dipole as shown and bend it also 30 degrees away from the vertical. One side goes through a hole in the plate and the other to an SO239 fitting.

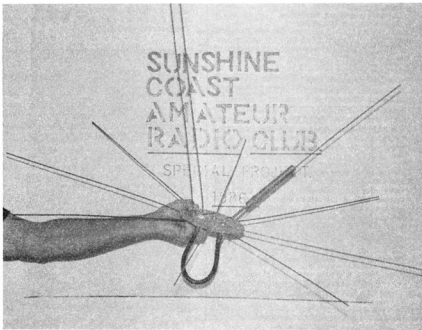
Now, make eight ground radials. They will protrude 419 mm from the edge of the disc so make them a little longer so you can solder them to the metal.

Forget resin cored solder — you need a man-sized iron, 60/40 bar solder and raw muriatic acid. Wash off with water when the job is completed.

(By the way — did you know that the ground plane antenna was invented in 1938 by George Brown et al, and first tested at the RCA Laboratory, Camden, New Jersey. George went on to patent this invention in 1941).

The only other thing left now is to make a quarter wavelength of 75 ohm coaxial cable for the phasing line.

Begin with a length about 350 mm long and reduce it a few millimetres at a time whilst checking it with a grid-dip meter until it approaches a frequency of 145.900 MHz. Tuning procedure is simple. Before attaching the phasing line apply power directly to the vertical radiator, and tune the gamma device for minimum SWR. (It came down smoothly for the author).



Next, the same for the folded dipole, you have plenty excess protruding through the plate for minor adjustment, but it should not be necessary. After that attach the phasing line and normal coaxial feed of 50 ohms. (When the author reached this stage the device was sitting on a cardboard box on the floor of the shack with the receiver on scan. It was heartening to hear an out of town repeater, at Gympie, identify).

The unit was placed on an arch outside the shack about two metres above ground level and I lay-in-wait for OSCAR-12.

It has since worked particularly well for uplink work on that satellite. At low elevation I use around 30 watts of VHF power as I am firing through trees etc. At higher elevations, power is reduced to 10 watts with very good results.

For those curious about how the matching works, I shall explain. The gamma match is tuned for 50 ohms and the 75 ohm quarter wavelength line transforms this to 112 ohms. The folded dipole has an impedance of 100 ohms, and since this is effectively in parallel, there is close to 52 ohms for the coaxial cable from the transceiver — Neat eh!

If the opportunity arises, I may describe some of these antennas from the past in future articles.

MODIFIED X-BEAM FOR 20 METRES

John Moen VK2KA
6 Gordon Street, Armidale, NSW. 2350

IT ALSO OFFERS less wind resistance than a cubical quad, and may be more acceptable aesthetically than a quad or a conventional Yagi.

The original design was first introduced to me about 20 years ago by Chas Buckley VK3PP to whom I am indebted for the step-by-step construction procedure which he so kindly provided. There are just two elements — a driven element and a director. (See Figure 1). Each element is in effect, condensed into a shape like the Greek capital letter Sigma Σ . When properly mounted, it is easily rotated on top of a seven metre length of 27 mm OD water pipe. The feedline is 52 ohm coaxial cable.

My design reduces the turning radius by over 30 percent; ie from 3.66 metres on each leg to 2.44 metres. This is accomplished by substituting loading and coupling coils at the centre of the driven element. It thus enables inductive link coupling to be used with advantages which will be apparent when the time comes for tuning it. The idea comes from the *ARRL Antenna Book* 1960 edition. In the chapter on Rotary Beam Construction, pp 269-270, miniature beams are described and my coil assembly L1/L2, see Figure 3, is taken direct from their design.

Regarding the material used for the elements, I chose bamboo rods whereas Chas VK3PP, used aluminium tubing with the latter forming part of the conductor. When using bamboo, two or three coats of marine varnish need to be applied before securing the conductor wires by tape or clamp. Heavy duty nylon fishing line is required for connecting the four ends of the rods, and for the supports radiating from the central king post. Bricklayers nylon twine is also ideal.

The G4ZU X-Beam is well-known as a reasonable substitute for a two-element Yagi, where available space at one's QTH is at a premium.

CONSTRUCTION

1. Take a piece of steel plate 300 x 300 x 3 mm. Drill a 25 mm hole in the centre to take the king post later. On the base weld a 100 mm length of water pipe 28 mm ID capable of forming a snug fit over the 27 mm OD mast pipe. Drill screw holes on each diagonal of the plate to take the clamps or L-bolts holding the bamboo. The latter will dictate the size required. See Figure 2. Drill holes also for two stand-offs.
2. Choose a wooden rod such as an old broom handle that will fit into the 100 mm length of pipe. This will act as a post to keep the unit off the ground during assembly.
3. Obtain four identical pieces of bamboo rod each 2.5 metres long. Treat with three coats of marine varnish. Bolt or clamp to the mounting plate. See Figure 1.
4. Wind coils L1/L2 (See Figure 3) as follows: L1 former — 200 mm long, 40 mm OD heavy duty 3 mm thick black polythene tubing which is obtainable from tyre repair specialists. L1 consists of five turns of No 12 copper wire

RADIODES

COMPREHENSION

Summer ist y'Kurmen an
Get your apparel tuned man.
Wenn Sie can't get on ze air
Don't blame Curmen — au contraire
Vous will feel un tres grand fool
If you hab' nicht tuned eine spule.

Quand conditions sind nicht gut
Watch the pressure of your blut.
Say "manana" to vous vous,
Specto telli for the news.
Prenez vite a cup of char
Or else schrieben an Ihre ma.

Es is nicht gut to be presto
Parce que you are en QSO.
Settle down — essen le fabric,
Ne sois pas DXCC sick.
Domani certainement must follow,
Sante's meilleur if traquillo.

SO NW OM WLL SY T3
ES AGN WE U WLL C
TNX FER FB QSO
GRU7 ES HR NIL SO
HPE CU FON S 9 HI
TNKS FER ALL NW QSY

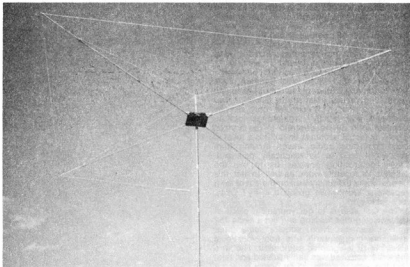
— "Hamband" (Originally printed in the Nigerian ARS Newsletter 1970s)

DRAM

No, it is not the misspelling of a "wee-drop," but DRAM is the new IBM chip that has been developed by their engineers in their bid to revolutionise and reduce the end cost of their product on the market.

The bit illustrated, and you will need your glasses, will hold four megabits of data in RAM, which can be accessed in, wait for it, 65 nanoseconds. At this rate its memory of 4 194 304 storage cells, equivalent to approximately 40 pages of double spaced typed manuscript, in the excessive time of less than a quarter of a second.

The engineers have produced the device with consumption of power in mind. It operates off a 3.3 volt rail instead of the conventional 5 volt standard, that we have become accustomed to.



X-Beam (modified). L1, L2 at front of mounting plate. L3 (on director) at rear.

An artists impression of the 'device' reproduced as the actual size.

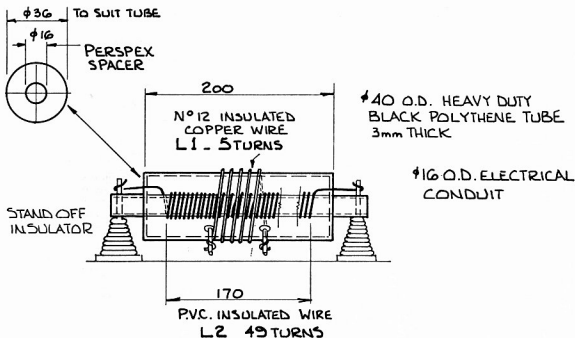


Figure 3: Loading Coil with Coupling.

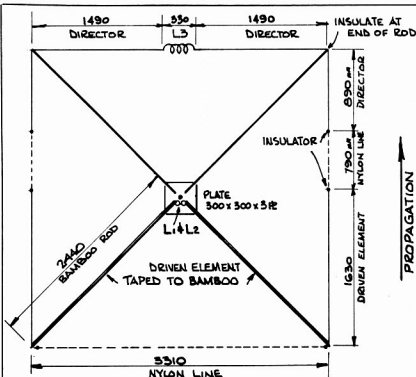


Figure 1: Modified X-Beam.

spaced to give a coil length of 50 mm. Seal in place with epoxy.

L2 former — 275 mm long, 16 mm OD electrical conduit. L2 consists of 49 turns of insulated copper wire close wound. Length of the coil is 170 mm. I used the stranded type from ordinary twin flex.

Mount the two coils as shown with L2 coaxially inside L1. Layered perspex strips can be used for the two stand-offs and for spacers where required.

5. Mount the coil assembly L1/L2 on the plate and solder 4.1 metres of bell-wire or suitably insulated antenna wire to each end of L2. Tape or clamp each to the two bamboo rods chosen to make the driver element leaving the ends free for the moment.

6. Wind coil L3, for the director, as follows: L3 former — 330 mm long 16 mm OD as in L2. Coil consists of 88 turns of stranded insulated copper wire as in L2, close wound. Solder 2.4 metres of bell-wire to each end. This constitutes the director.

7. Suspend the director centrally between the ends of the two unused bamboo rods and insulated from them. Adjust tension on the two nylon lines connecting the ends of the director and ends of the driven element as shown in Figure 1.

8. Take a 400 mm length of dowelling or broom handle 25 mm OD or wider. Sharpen one end and drive it into the centre cavity on the mounting plate to act as a King Post for the four nylon cords suspending the ends of the bamboo rods. Final adjustments of tension must wait until the antenna is tuned. Secure a 100 mm sleeve to the mast with 2 x 5 mm bolts through both sections of piping.

TUNING

Using a dip-meter check for resonance at the preferred frequency and trim equal amounts of

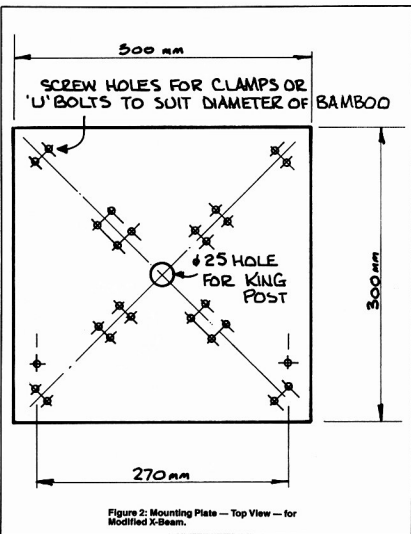


Figure 2: Mounting Plate — Top View — for Modified X-Beam.

conductor wire from each end of the driven element. The test is made at the L1 feed-point.

Check resonance of the director also, with a one-turn test loop around the centre of L3. I aimed at a frequency of 14,800 MHz for a corresponding preferred transmit frequency of 14,150 MHz. Allowance must be made for the height of antenna chosen so a further trimming may be required even after erecting it to mast-height. At my QTH the mast height is seven metres, and the following readings were obtained when power was eventually applied:

Frequency MHz	14,000	14,100	14,150	14,200	14,250	14,300
SWR	1.3:1	1.0:1	1.0:1	1.1:1	1.5:1	1.7:1

SUPPLEMENTARY NOTES

The element spacing, i.e. that between driven element and director, approximates the optimum theoretically for a two element Yagi of one quarter wavelength.

The inductive coupling between L1 and L2 has provided good EMC. Even though the X-beam is only five metres away from the television antenna no TVi has been apparent on Channels 5A and 10.

The X-beam exhibits up to three S-points gain in front-to-back ratio on receive. I have insufficient data for the same test on transmit as I have no remote control facility to rotate the mast and there is some delay in doing it manually.

The ground peg for the mast is a section of 20 mm OD water pipe embedded in concrete. This size fits snugly inside the pipe mast which has an ID of 23 mm and permits easy rotation when adequately greased with petroleum jelly. The mast has additional support by an antenna U-bolt with wing-nuts enabling it to be clamped to a post or the house.

The three types of water pipe — the sleeve welded to the mounting plate, the mast pipe itself and the ground peg — are all available from plumbing supply sources.

If desired, aluminium tubing may be used instead of the bamboo in which case the driven element could include these legs as part of the conductors but the clamped end would need insulating with polythene irrigation tubing or similar material and some experimentation would be necessary on the length of the conductor wires.

APPLICATION FOR 80 METRES

I have used inductive coupling successfully in an 80 metre dipole substituting a coil, L2, at the centre instead of the usual connection. This also shortens the overall length from 39.6 metres to 18 metres, which is convenient for a small backyard. Using only one former this time — the 40 mm OD tubing — L2 consists of 200 turns of bell-wire close wound in two layers. At each end is connected 8.8 metres of No 16 wire for the antenna. The primary L1 consists of 12 turns of No 12 wire wound on top of L2, coaxially, and spaced to give a coil length of 60 mm. This should provide a SWR of 1.0:1 on a frequency of 3,600 MHz at an antenna height of 10 metres above ground.

References:
SCHULTZ, JOHN J. W2EYDJOBY. The G4ZU X-Beam for 20, CQ magazine, June 1985.
The ARRL Antenna Book, 1960 edition, chapter 12 — Rotary Beam Construction — Miniature Beams.

SILENT KEY

Robert Gunderson W2JJO, 67, a well-known QST author, died on January 11, 1987.

Robert worked for the Hudson Radio Company, in New York City, answering customer questions. He became known as the "question-and-answer man of radio row".

W2JJO, who was blind since birth, edited and published for 25 years *The Braille Technical Press*, a monthly electronics magazine for the blind. He was known for developing test instruments for blind engineers and technicians. Prior to retiring in 1974, he taught radio electronics for 37 years at the New York Institute for the Education of the Blind.

—Adapted from *The ARRL Letter* February 10, 1987

FO-12 MODE JD COMES ALIVE

What may have been the first two-way packet QSO between US amateurs using the mode-JD transponder aboard Japan's FO-12 satellite took place on February 26, 1987, between Ed Krome KASLNV and Andy MacAllister WAS2IB. The transponder is set up to act as a digipeater. Ed reports:

"...at 2330 UTC, I did a connect to myself (through the satellite). Then at 2332 and at 2339, I monitored WAS2IB connecting to himself. I connected to him at 2340 for a rather brief QSO. What a thrill! Although I tried out all the uplink channels, the two-way QSO was on 145,890 MHz.

"My equipment was a RadioShack Model 100 computer and a PacComm TNC-2. The modem was a G3RUH board. The FM uplink was a FT-20BR hand-held (yes, an HTI) driving a home-brew 30 watt amplifier. The antenna was horizontally polarised home-brew 12 element Yagi, built to the NBS design. For the 70 cm downlink, I used a 19 element home-brew K2RIW Yagi and a home-brew GaAsFET mast-mounted preamplifier. This led a Microwave Modules receiver converter, which was attached to a TS-430S. Use of the 430S allowed use of the digital AFC provided by the G3RUH modem.

"Some observations: The downlink Doppler shift was enormous! The received signal was found at about 435,922 MHz at acquisition of signal, and had shifted to 435,905 MHz by the time the satellite disappeared over the horizon. The digital AFC would move the receive frequency as much as 5 kHz in one ON period. (The satellite currently runs the Mode-JD transponder in a five-minutes-ON/five-minutes-OFF cycle — Ed). Tuning for modem lock was relatively easy, although it is possible to tune to an erratic lock that won't print. After an OFF period, the downlink frequency shifts so far that you must manually tune the receiver to re-acquire lock."

—By Ed Krome KASLNV

(Aside from the five minute ON/OFF cycle, there is a two-hour ON/two-hours-OFF cycle. During the two-hour ON period the five-minute ON/OFF cycle is executed. —Ed).

On February 28, W3IWI and G3RUH had what is believed to be the first US/Europe QSO via mode JD. Other European calls heard at that time were BD20S and ON6UG.

—From *Gateway*, The ARRL Packet-Radio Newsletter, March 6, 1987

PHOTOPHONES REVISITED

A review of amateur optical communications

Continued from previous issue. . .

Mike Groth VK5AMG

11 Branch Road, Stirling, SA. 5152

Photocells

A photocell (Figure 21) is a vacuum diode whose cathode is coated with a material that emits electrons when exposed to light. The spectral response is determined by the cathode coating, which may be a mixture to produce a more constant sensitivity across the visible spectrum. Most photocathodes are relatively insensitive to red and infra-red light but a photocell with a caesium cathode can detect infra-red wavelengths out to nearly 1300 nm.

Photocells are large detectors with cathode areas from one square centimetre to 10 cm² but they have a very low thermal noise, wide dynamic range and fast transient response. They have been successfully employed as detectors in visible light photophones in the past but have been largely superseded by the silicon photodiode.

Photomultipliers

A photomultiplier is a vacuum photocell fitted with a series of dynodes (Figure 22) which multiply the photocurrent by secondary electron emission. A typical photomultiplier has a sensitivity of the order of 10^6 amps/watt, and can detect a modulated light flux of 10^{-13} W.

The photomultiplier is best suited for detecting faint light signals in a dark environment and will saturate with a relatively low level of background light. They are very expensive (\$50 plus) and relatively fragile devices which can be damaged if exposed to a bright light with the HT applied. They are mainly used for amateur optical DX experiments and are not recommended for inexperienced amateur experimenters.

Photodiodes

Photodiode A photodiode uses the photon energy to produce charge carriers in the depletion region of a semiconductor junction and generate a current. This phenomenon is observed in several semiconductors but the highest quantum efficiency and lowest leakage are obtained with a p-n junction which has a wide depletion layer. A photodiode acts as a current generator but is often operated with a reverse bias (Figure 23) to improve the transient response.

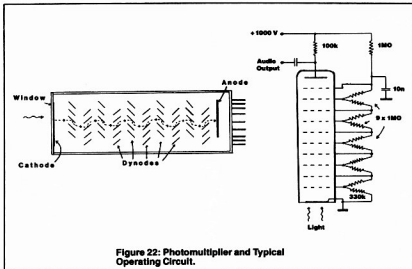


Figure 22: Photomultiplier and Typical Operating Circuit.

A silicon photodiode will detect ultra-violet, visible and near infra-red radiation out to a wavelength of 1100 nm. The peak response at 950 nm is near the emission wavelength for infra-red diodes and many of the small photodiodes sold by electronic component suppliers have an integral infra-red filter. Photodiodes are well suited for optical communications being small, cheap and rugged with a high quantum efficiency and a relatively low thermal noise level.

Measurements made by the author indicate that a BPW50 silicon photodiode connected to a low-noise audio amplifier can detect a tone modulated signal of $2 \times 10^{-11} \text{ W}$ at a wavelength of 900 nm. An AM speech signal of 10^{-19} W is quite readable while an FM subcarrier system requires a signal flux approaching $2 \times 10^{-10} \text{ W}$.

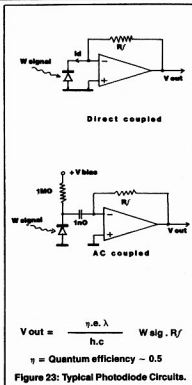


Figure 23: Typical Photodiode Circuits.

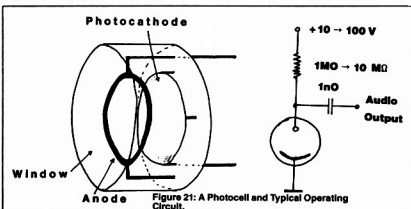


Figure 21: A Photocell and Typical Operating Circuit.

wavelengths shorter than 350 nm. An ultra-violet optical link would present a significant visual hazard to anyone looking down the transmitter beam without eye protection.

Atmospheric water vapour produces strong absorption bands in the near infra-red as can be seen in Figure 26 which shows the transmission factor over a one kilometre path on a fine autumn or spring day. The infra-red absorption would be lower on a clear frosty night but more than doubled for a humid summer's day.

Atmospheric absorption from rain, mist, fog, smoke or dust is the main limitation on the reliable operating range of an optical link. There is no significant difference in the transmission of infra-red and visible light in fog or rain. It is not possible to predict the signal loss due to adverse weather conditions with any precision but a rough estimate of the attenuation coefficient may be made from the daylight visual range with the aid of Table 2.

Background Light

Background light falling on the detector will generate white noise which is often the main noise contribution in an optical receiver operating during the day. The detector current from the background light will be a function of the brightness of the background at the operating wavelength, the receiver beamwidth, and the spectral response of the detector and optical filters.

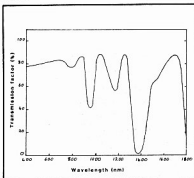


Figure 26: Atmospheric Transmission for a One Kilometre Path.

Code No	Daylight Visual Range	Description	Attenuation Coefficients (km ⁻¹)	(dB/km)
0	50 metres	Dense fog	92	400
	100 metres	Heavy fog	46	200
	200 metres	Thick fog	23	100
1	500 metres	Moderate fog	9.2	40
2	1 km	Light fog	4.6	20
3	2 km	Thin fog	2.3	10
4	4 km	Haze	1.2	5
5	10 km	Light haze	0.46	2
6	20 km	Clear	0.23	1
7	50 km	Very clear	0.09	0.4
8		Exceptionally clear		

Table II: The International Visibility Code.

The reflectance and colour of the background will depend on the transmitter environment: trees, sky, buildings, etc. The ambient illumination will vary with the weather and the time of day. However it is possible to estimate background light levels for special cases so that the daylight performance of different systems can be compared.

The albedo or average reflectance of the earth is about 0.3 and the solar illumination at the surface is 1100 W/m². It has been assumed that the background at noon on a fine day has a brightness of 330 W/m² which is equivalent to a luminance of 50 Wm⁻²ster⁻¹. The corresponding spectral radiance R(λ) is plotted in Figure 27.

The background luminance on a heavily overcast day, may be less than 10 Wm⁻²ster⁻¹ and at sunrise and sunset the solar illumination is about one percent of its noon value. The full moon is about a million times less bright than the sun and the background radiance in these cases may be estimated by dividing the values read from Figure 27 by the appropriate factor.

It can be shown that the flux reaching the detector of an optical receiver operating with a background radiance R(λ) is given by:

$$W_{bg} = \frac{A_r A_d R_{bg}(\lambda) (\Delta\lambda)}{f^2} \quad \text{watts}$$

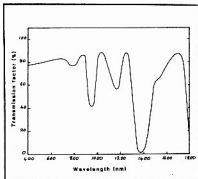


Figure 27: Assumed Daylight Background Radiance.

Where A_r = Area of receiver lens or mirror. (m²)

A_d = Active area of detector. (m²)

η = Transmission factor of optical system.

$R_{bg}(\lambda)$ = Background radiance. (W m⁻² ster⁻¹ nm⁻¹)

$\Delta\lambda$ = Spectral bandwidth of the receiver. (nm)

The noise equivalent power (NEP) produced by this background light flux is;

$$NEP = \int_{\lambda} \frac{W_{bg}}{\Delta\lambda} d\lambda \quad \text{watts}$$

Where Δf = Audio bandwidth (Hz)

It can be seen that an optical receiver for operation in the presence of background light should have a narrow field of view and an optical filter centred about the operating wavelength. A very narrow band interference filter ($\Delta\lambda = 3$ nm) can be used with a gas or injection laser but a wider bandwidth ($\Delta\lambda = 30$ nm) is required to transmit the radiation from a light emitting diode. A simple red or infra-red filter will give a significant improvement in the signal to noise ratio when detecting radiation from an incandescent light source.

Typical values for the background light flux and noise level for several common detectors and filters are given in Table 3. This table assumes a lens diameter of 100 mm and a focal length of 250 mm. For lenses or mirrors having a significantly different f/d ratio the NEP from the table should be multiplied by 2.5 D/f.

Detector & Filter	Central Wavelength λ (nm)	Optical Bandwidth Δλ (nm)	Detector W _d (W)	Light Noise NEP (W)
Solar cell, 15mm x 13mm BPW50 silicon photodiode. (with IR filter)	700	700	5 x 10 ⁻⁴	2 x 10 ⁻⁹
OAIP12 Germanium photodiode. (no filter)	900	400	5 x 10 ⁻⁶	2 x 10 ⁻¹⁰
BPW50 photodiode with narrow filter (GaAs diode)	1000	1200	2 x 10 ⁻⁶	3 x 10 ⁻¹⁰
Photomultiplier with interference filter. (He-Ne laser)	900	30	4 x 10 ⁻⁷	4 x 10 ⁻¹¹
	633	3	9 x 10 ⁻⁸	7 x 10 ⁻¹²

Table III: Background Light Estimates.

This table assumes:

- 1 100 mm diameter lens or mirror.
- 2 f = 250 mm.
- 3 Full noon sun. $I_{bg} = 50$ Wm⁻²ster⁻¹

For other weather or lighting conditions the detector flux and noise power can be estimated as follows;

Overcast day:	Divide W_{bg} by 10.	NEP by 3.
Sunrise or sunset:	Divide W_{bg} by 100.	NEP by 10.
Full moon at zenith:	Divide W_{bg} by 1000000.	NEP by 1000.
Moonrise or moonset:	Divide W_{bg} by 10 ⁶ .	NEP by 10000.

Operating Range

The operating range of an optical link is dependent on the weather and time of day. Any quoted range must be qualified with the appropriate operating conditions. The vacuum range is the theoretical communications range in the absence of atmospheric absorption and is a convenient parameter for expressing the optical performance of a given transmitter and receiver. The operating ranges for various conditions can be estimated from the vacuum range and the atmospheric attenuation coefficient as illustrated by the following example.

A simple photophone transmitter consists of a current modulated Tandy XC880 GaAs infra-red diode mounted at the focus of a 100 mm magnifying glass (f = 250 mm). The transmitter beam intensity may be calculated as follows.

The specifications for the Tandy XC880 IR LED are:

Emission wavelength	= 880 nm
Power output @ 20 mA	= 1 mW
Dispersion angle	= 24 degrees. (half power point)
Source diameter (d _s)	= 5 mm

The source intensity is calculated by assuming the radiation is emitted into a 24 degree cone when:

$$I_s = \frac{1 \text{ mW}}{2\pi[1 - \cos(12^\circ)]} = 7.3 \text{ mW/sterad @ } 20 \text{ mA.}$$

The transmitter intensity and beamwidth will be:

$$I_s = I_s \left[\frac{D_{\text{beam}}}{d_s} \right]^2 = 2.9 \text{ W/sterad, @ } 20 \text{ mA}$$

$$\theta_{\text{beam}} = \frac{5 \text{ mm}}{250 \text{ mm}} = 20 \text{ milliradians, or } 1.2 \text{ degrees}$$

If the detector is a BPW50 infra-red photodiode then a signal flux of 10^{10} W will be required for speech reception. For a 100 mm diameter lens the minimum transmitter illumination will be:

$$E_{\text{min}} = \frac{4 W_{\text{min}}}{\pi Q_{\text{opt}} (D_{\text{min}})^2}$$

where Q_{opt} = Optical efficiency. (From Table 4)

$$= \frac{4 \times 10^{10}}{\pi \times 0.8 \times (0.1)^2} = 1.6 \times 10^8 \text{ W/m}^2$$

and the Vacuum Range (VR) will be:

$$VR = \sqrt{\frac{I_s}{E_{\text{min}}}} = \sqrt{\frac{2.9}{1.6 \times 10^8}} = 13.5 \text{ km}$$

The operating range (OR) can be obtained from the equation:

$$\text{Log}_{10} VR = \text{Log}_{10}(\text{OR}) + \text{OR} \times [\text{Transmission loss (dB/km)}/20]$$

This equation does not have a simple analytic solution for the operating range but can be solved by successive approximations. From Table 4 the clear air transmission loss at a wavelength of 880 nm is 0.8 dB/km which gives an operating range of 7.4 km on a clear night.

In the middle of a fine sunny day the background light noise for a BPW50 infra-red photodiode at the focus of a 100 mm lens ($f = 250 \text{ mm}$) will be about $2 \times 10^{10} \text{ W}$ (Table 3). In this case, a signal flux in the order of 10^8 W will be required for speech reception. Repeating the previous calculations with $W_{\text{min}} = 10^8 \text{ W}$ will give a vacuum range of 4.3 km, and a clear air daylight range of 3.3 km.

The background light noise at sunrise and sunset will be about the same level as the detector and amplifier dark noise. Assuming a total noise level of $5 \times 10^{10} \text{ W}$ and a minimum useful signal of $2 \times 10^{10} \text{ W}$ for speech communication the clear weather twilight range would be 5.9 km. The background light from a full moon would produce a detector noise of less than 10^{12} W which is much smaller than the typical receiver dark noise and moonlight will not significantly effect the operation of this optical link.

The effect of water vapour may be illustrated by repeating these calculations for an optical link using a CQY89 GaAs LED as the light source. The intensity of the CQY89 (7.5 mW/sterad @ 50 mA), is similar to the XC880 giving a vacuum range of 13.7 km. The emission wavelength of 930 nm is on the edge of a water vapour absorption band and the predicted operating range is reduced to between four kilometres on a humid summer evening and six kilometres on a frosty night. The predicted clear daylight range is 2.2 km to 2.9 km depending on the humidity.

The estimated clear weather operating ranges for various optical communications systems are listed in Table 5. It can be seen that quite simple equipment can transmit speech or data over distances of two or three kilometres in clear weather. Over long optical paths the received signal strength is primarily determined by the atmospheric attenuation. Very intense transmitter beams are required for long distance optical communication.

Reliability

The reliability of an optical link depends on the path length as well as the frequency and severity of adverse atmospheric conditions. Signal losses of 200 dB/km at a wavelength of 900 nm have been observed by the author during thick fog with fluctuations of 30 dB/km over periods of a few seconds. Under these conditions, an optical link using infra-red LEDs and photodiodes would have an operating range of about 180 metres. A modulated gas laser beam would be readable at 500 metres. A transmitter using a 100 W quartz-iodide lamp would have a range approaching 280 metres.

Therefore an optical link using simple components can provide reliable communication over distances of 100 to 150 metres in all weather conditions. Signal dropouts would be experienced during heavy fog at 200 metres while a light fog or heavy rain would disrupt communications over a one kilometre optical link. Depending on the equipment used amateur photophone contacts of five to 10 kilometres could be expected on clear nights with possible DX contacts of 50 kilometres or more under suitable atmospheric conditions.

Transmitter & Detector (100 mm lenses used at each end)	Night Vacuum Range (km)	Clear Night Range (km)	Clear Daylight Range (km)
XC880 GaAlAs LED (880 nm) + BPW50 Si photodiode (IR filter) CQY89 GaAs LED (930 nm) + BPW50 Si photodiode (IR filter) High intensity red LED + Si phototransistor (Red filter) NE 2 Neon globe + Si phototransistor 100 W sodium vapour lamp + Si photodiode (yellow filter) Current modulated torch globe + CAP12 Ge photodiode (no filter) 12 V, 100 W quartz-iodide lamp + CAP12 Ge photodiode (no filter) 12 V, 100 W quartz-iodide lamp + BPW50 Si photodiode (IR filter) 10 mW He-Ne gas laser + Photomultiplier (3 nm filter)	13.50 13.70 13.40 3.40 0.61 43.00 1.10 170.00 134.00 60000*	7.40 4.80 2.80 0.58 0.58 13.00 0.90 16.00 17.00 73.00	3.30 2.50 2.00 0.45 0.60 7.60 0.90 13.00 15.00 48.00

* Assuming a beam divergence of 200 microradians (200 m/mkm)

Table V: Operating Range Estimates.

OPTICS RADIO AND WIRELESS

The use of light to transmit information was a form of wireless communication under the broad definitions employed in the Wireless Telegraphy Act, but the 1983 Radio Communications Act defines a radio transmission as:

any transmission or emission of electromagnetic energy of frequencies less than three terahertz; or
 any highly coherent transmission or emission of electro-magnetic energy of frequencies not less than three terahertz and not exceeding 1000 terahertz, without continuous artificial guide.

This definition excludes incoherent optical signalling systems such as amateur photophones or infra-red remote control systems but a commercial laser powered optical link is a radio system, and requires a licence.

At present there are no Australian frequency allocations above 300 GHz, and it would assist in the orderly development of the sub-millimetre spectrum, if the WIA approached the Department of Communications with a proposal for amateur allocations above 300 GHz. This application could include reasonable use of coherent radiation from 100 THz to 1000 THz ($3 \mu\text{m}$ to 300 nm) for amateur communications experiments. (This will be investigated. —Ed).

CONCLUSIONS

Optical communication is a practical method for transmitting information over short distances. It is used commercially for computer links between city buildings or across roads where it is not practical or economic to use a wire or radio circuit. Optical links would be well suited for linking amateur computers especially between apartment blocks where RF links can cause interference with adjacent entertainment and security systems. An optical packet message system would be tolerant of the occasional signal dropout caused by rain, fog or birds flying through the beam and it is not impossible to visualise the future establishment of an

Light Source	Detector & Optical Filter	Wave-length (nm)	Optical Efficiency Q_{opt}	Clear Weather Atm (dB/km)
				Frost Mild Humid
Low press mercury	Si photodiode Blue-green	430-580	0.4	1.1 1.1 1.2
Green LED	Si photodiode	565	0.5	0.8 0.9 1.0
Sodium	Si photodiode	589	0.5	0.8 0.8 0.9
He-Ne laser	Si photodiode	633	0.3	0.8 0.8 0.9
He-Ne laser	Photomultiplier + 3 nm filter	633	0.6	0.8 0.8 0.9
Red LED	Si photodiode	650-700	0.6	0.7 0.8 0.9
GaAlAs LED	Si photodiode + IR filter	880	0.8	0.6 0.6 0.7
GaAs LED	Si photodiode + IR filter	930	0.8	1.2 1.9 2.6
Filament (T = 2870°K)	Si photodiode (no filter)	400-1100	0.21*	0.8 0.9 1.0
Filament (T = 2870°K)	Ge photodiode (no filter)	400-1600	0.35*	1.1 1.3 1.6
Filament (T = 2870°K)	Si photodiode + IR filter	800-1100	0.066*	0.9 1.0 1.1

* Assuming 75 percent of the power supplied to the lamp is emitted as visible or infra-red radiation from 0.3 μm to 20 μm .

Table IV: Optical Range Parameters.

amateur optical packet network in the high-rise residential systems of the capital cities.

Optical DX can provide a challenge to the radio amateur or experimenter who likes to do things the hard way. Optical voice and data transmissions of 100 km or more have been achieved in the past and optical moonbounce is technically possible. In many ways, optical communication has come of age after a century of retarded development. It is both the oldest and one of the newest branches of amateur radio.

ADDITIONAL READING

This review is a distillation of information gathered from many sources by the author over a period of 18 years and it would be impossible to give a comprehensive listing of references. Much of the theory can be found in

standard physics text books but the following references make interesting background reading and provide a suitable starting point for a detailed literature search if desired.

1BELL, A G

On the Production and Reproduction of Speech by Light, American Journal of Science, Vol 20, No 118, pages 305-324, (October 1880)

2FRANKINE, A O

On the Transmission of Speech and Light, Proceedings of the Physical Society of London, Vol 31, pages 242-268, (1919)

3HUXFORD, W S & PLATT, J R

Survey of Near Infra-Red Communication Systems, Journal of the Optical Society of America, Vol 38, No 3, pages 253-268, (March 1948)

4SNYDER, H S & PLATT, J R

Principles of Optical Communications Systems, Journal of the Optical Society of America, Vol 38, No 3, pages 269-278, (March 1948)

5BEESE, N C

Light Sources for Optical Communication, Infrared Physics, Vol 1, No 1, pages 5-16, (1961)

6KING, B G, et al

An Experimental Study of Atmospheric Optical Transmission, Bell Systems Technical Journal, Vol 62, No 3, Part 1, pages 602-625, (March 1963)

TECH EDITOR'S NOTE: An account of such experiments by amateurs was published in *Amateur Radio*, Optical Communication for the Amateur by Chris Long, AR, January 1979, page 7.

WANT TO TRY RTTY?

RTTY is simple with the VZ200/VZ300 computer and the RTTY Modem Kit which is readily available from Dick Smith Electronic stores.

The writer has built four such units, and worked on several others. They work well on both FM and SSB signals. Tuning is much more difficult however to decode an SSB transmission.

Firstly, some pertinent points:

- 1 A frequency counter is necessary to correctly align the modem.
- 2 The circuit board traces in many places are very thin and are inclined to lift, so do not attempt to solder this kit unless you have a good soldering iron.
- 3 It is necessary to bend the pins on the 44 pin edge connector. This is directly related to point 2. Once this connector is soldered to the board do not attempt to remove it or it may be necessary to spend many hours repairing circuit traces.
- 4 It is good practice to utilise sockets for all ICs.

Following is an outline of the procedure I used in assembling the kit in the hope that it will operate first time if you decide to go ahead with the project.

- a Check that the kit contains all the correct components — check them off against the list and place them in a safe place; eg in a component file drawer or a block of foam, just so long as they are safe.

(Technical Editor's Note: Do not insert ICs and semiconductors into white styrofoam as static electricity may impair their performance.)

- b Prepare the project case carefully following the instructions provided with the kit.
- c Bend the pins on the 44 pin edge connector. Take great care here to ensure that it closely resembles the illustration provided in the instructions.

Cheer up! The boring, time-consuming and tedious part is over and assembly of the boards can commence.

- 1 Start by installing the wire links on each board.
- 2 Next, insert the components, soldering each one as you install it. This will prevent solder bridges and/or missed joints which are not soldered at all. Also, keep in mind the appearance of the board. Try as much as possible to keep the component codings running in the same direction.
- 3 When all components and IC sockets are soldered into place install all the ICs, with the exception of the EPROM.

- 4 The 44 pin edge connector can now be placed in position, but do not solder it yet! Proceed now as though the project were complete. Place the project in the case, ensuring all the holes line-up, and then plug it into the expansion port. If everything lines-up and the edge connector is correctly seated, you may now solder the edge connector in place.
- 5 The last thing to do is wire the five pin DIN plug and wiring between the boards. Colour code these wire so they don't accidentally become mixed up.
- 6 Before putting the EPROM in place check all soldering and wiring. Ensure all IC pins are in their sockets correctly and none are bent under.

If everything checks out, insert the EPROM. Again ensure the pins do not fold under.

It is now time to put everything together in readiness to align and test the unit.

- a Place the two boards back-to-back as per the instructions. Ensure the soldered surfaces of neither board are touching. They should not if you have used the plastic bolts and nuts thoughtfully.
- b Plug the modem into the expansion port of the VZ200/300 and switch the computer on. If all is well you should be greeted with a copyright message, etc as shown on the instructions. If not, switch off and prepare to go fault-finding. Check the fault remedy chart.

ALIGNMENT

Do as the instructions say. Align the transmit frequencies, toggling between +5V and ground several times to ensure the frequencies are correct. As the two adjustments interact somewhat a little patience is required to align both frequencies correctly. See fault remedy chart.

Remember that five volts is available anywhere VCC is marked.

There are several ways in which the receiver can be aligned without the aid of a signal generator and scope.

- a Remember that you have already aligned the transmitter tones so all that requires to be done is to record a minute or two of RYS, etc. Then, play them back into the receiver and adjust RV2 for best decoding. The LED should glow brightly.
- b If you have a two metre FM unit, use the transmitter to access the RTTY. Repetier and use one of the pre-programmed responses to tune RV2 for best decoding; eg in Melbourne VK3RTY on 147.350 MHz (+600 kHz offset) will respond with a menu file if space?W is sent. (Space means the space character or space bar, not the

Terry Morrison VK3RB

123 Sunshine Road, West Footscray, Vic. 3012

word! I).

Of course, you may use the method as shown in the instructions if a scope and signal generator are accessible. I have used this method and found that the other two methods are quicker and equally successful.

As I have worked very little RTTY on HF with the system I cannot say whether the receiver alignment is any more critical for SSB reception. However, when testing my own unit on the 80 metre broadcast it worked quite satisfactorily, losing the decoding only during loud static or interference.

Good luck with the project and, if you take time and care, you will be rewarded with a successful RTTY system.

Following is a list of some faults which may be encountered and a list of items to check. (Of course, it is assumed that you have checked the wiring, soldering and that the ICs are all correctly inserted in their sockets). Also, check that the wiring of the five pin DIN and microphone plugs are correct — the failure of many units has been traced to this.

FAULT	KEY
VZ Basic only at power on	A, B, C
Garbage characters on screen	B, C
Transmit relay not working	C, D
Tones not changing (Relay OK)	E
No tones	F
Cannot tune 22.950 Hz tone with RV3	H
No receive decoding	G

KEY CHECK

A	EPROM inserted? EPROM faulty? (unlikely)
B	EPROM pins bent under?
C	Dry joint, solder bridge or broken trace at 44 pin connector EPROM socket or IC1
D	Faulty relay, faulty IC1, Faulty Q1, TXD line open circuit
E	RV1 or RV3 incorrectly set, IC4, IC7, IC2
F	IC5
G	Faulty IC6, RXD line open circuit, faulty IC4
H	RV3-RV5 combination incorrect.

NOTE:

Whilst testing the unit, unless you have the unit in its assembled state, ie the two boards placed one atop the other, it is likely the tuning LED will remain on whether or not a good signal is present.

GREAT CIRCLE CALCULATIONS FOR REVERSE POLISH CALCULATORS

lan Crompton VK5KIC
9 Craig Street, Richmond, SA. 5033

The program for calculating the distance between two stations, latitude and longitude of each known, which appeared in algebraic-calculator form in *Amateur Radio* can be used equally easily on RPN-logic calculators such as the *Novus Scientific* and *Hewlett-Packard* range.

The form of the program looks different, as RPN logic, which does the arithmetic function on the most recent pair of numbers to have been entered, or on the most recently calculated answer or entry and a previous one, does not need brackets to stop the calculator performing functions "not yet due" when the = key is pressed to perform some arithmetic.

The formulae are:

$$\cos D = \sin A \sin B + \cos A \cos B \cos L$$

and

$$\cos C = \frac{\sin B - \sin A \cos D}{\cos A \sin D}$$

where

- A = latitude of your station
- B = latitude of other station
- L = longitude of other station minus longitude of your station
- D = distance along the path in degrees of arc. Multiply by 60 to get nautical (air) miles, or by 111.111 to get kilometres
- C = true bearing from north if sin L is +ve. If sin L is negative, true bearing is (360 - C)°.

Do not forget, calculators use degrees and decimal divisions of degrees when calculating trigonometric ratios for angles. Many calculators have a program built into them to convert from degrees-minutes-seconds format to degrees and decimals. It does simplify the arithmetic if that facility is available!

THE PROGRAM

First, write down (or enter into memory, if enough memories are available) your station latitude and the latitude of the station contacted. Do not ignore sign, + for stations N latitude, - for stations S latitude.

Calculate and write down, or store, longitude of station contacted minus longitude of your station. W longitudes are entered as +ve, E longitudes as -ve.

Enter latitude of your station (watch that sign!), or recall it from memory.

Calculate its sine
Enter latitude of contact (mind the sign!)
Calculate its sine
X multiplies the sines
This result remains in the stack for later use
Enter latitude of your station
Calculate cosine of angle
Enter latitude of contact
Calculate cosine of angle

X multiplies cosines together
Enter difference in longitudes
Take its cosine
X multiplies by previous result (already in position)
+ adds this result to previous multiplication, already in position
Take arc cosine of result to get the distance expressed in degrees of arc
Write down, or store, for use in bearing calculation
Multiply by 60 to get distance in nautical (air) miles, by 111.111 to get distance in kilometres

BEARING

Enter latitude of other station
Take its sine, this remains in the stack for later use
Enter latitude of your station
Take its sine
Enter distance in degrees from
Take its cosine
X multiplies the cosines
— subtracts this from sin B calculated earlier
Enter distance in degree form
Take its sine
Divide it into last result
Enter your latitude
Take its cosine
Divide into previous result
Take arc cosine
If sine (difference of longitudes) is -ve, then bearing for antenna is (360 - bearing calculated).

WORKING THROUGH AN EXAMPLE

You are at Whyalla, 33° 02' south, 137° 35'. Looking up the Call Book, you find the other station's address is in Mildura. From an atlas, 34° 11' south, 142° 10' east.

Since calculators do arithmetic and calculate trigonometric ratios on decimally divided degrees, your location is -33.033° -137.583°; the other station, -34.183° -142.166°. L, the difference in longitude, is -137.583° - (-142.166°), or 4.583°. The minus signs express the convention used in the maths that North Latitude and West Longitude are positive. The Equator and Greenwich Meridian are each 0.

Key in your latitude (or call it from memory)
-33.0333
Take its sine, which is
-0.5451
Key in other station's latitude
-34.1833
Take its sine
-0.5618
X multiplies the sines
0.3063
This result remains in the stack to be used later
Enter your latitude
-33.0333
Take its cosine
0.8384
Enter other station's latitude
-34.1833
Take its cosine
0.8272
X (multiply the cosines)
0.6935
Enter longitude difference
4.5833
Take its cosine
0.9968
X (multiply by previous result)
0.6913
+ (add this answer to earlier calculation)
0.9976

This answer is the cosine of the distance in degrees of arc. Arc cosine 0.9976 is 3.9862°. Write it down or store it. It will be needed during the bearing calculation.

To get the distance in nautical (air) miles, multiply by 60, in kilometres, by 111.111.

Which makes the distance from Whyalla to Mildura 239.2 nautical miles, or 442.9 kilometres.

BEAM HEADING

Enter latitude of other station
-34.1833
Take its sine
-0.5618
Enter latitude of your station
-33.0333
Take its sine
0.5451
Enter distance in degree form
3.9862
Take its cosine
0.9976
Multiply the trig ratios
-0.5438
— (subtract from sine B)
-0.0180
Enter latitude of your station
-33.0333
Take its cosine
0.8384
Divide into earlier result
-0.0215
Enter distance in degree form
3.9862
Take its sine
0.0695
Divide into previous result
-0.3095
Take arc cosine of result
108.0262°
Since sine of longitude difference > 0, then bearing Whyalla — Mildura is 108°.

ACKNOWLEDGMENTS

Advanced Applications for Pocket Calculators Gilbert.

TAB Books, 1975.

The ARRL Antenna Book Hall et al. ARRL 1982.

Both of which gave information which provided answers inconsistent in either distance or bearing when checked against NATMAP maps covering the area of the example.



PRICE: \$130

Post Paid within Australia

LODESTAR "MAPLIN"

A PRECISION DIP METER with a frequency range of 1.5 to 250 MHz in six ranges, with plug-in coils.

Full specifications available.

A NECESSARY ADJUNCT TO ANY AMATEURS TEST EQUIPMENT.

WILLIAM WILLIS & Co. Pty. Ltd.
98 Canterbury Road, Canterbury, Vic. 3126
PHONE: (03) 836 0707



Try This!

Gil Sones VK3AUI
30 Moore Street, Box Hill South, Vic. 3128

NOISE BRIDGE

A novel noise bridge was described in Ham Radio for July 1986. The article was titled "A VHF Noise Bridge" by A E Popodi OE2APM/AA3K.

The unusual feature was the use of a PIN diode for the variable resistance arm and a variable capacitance diode for the variable capacitor. The bridge was designed for 144 MHz operation, the principle however, could be extended to any higher HF or VHF/UHF band.

The heart of the bridge is shown in Figure 1. The capacitance is controlled by the voltage source. The value of capacitance is determined by the voltage and the variable capacitance diode characteristics.

The resistance is controlled by the current flowing through the PIN diode and the characteristics of the diode.

The main advantage of this technique is that short leads with minimum stray inductance and capacitance can be achieved. This is especially important for VHF and UHF.

Another possibility is the remote mounting of the measuring head. This would enable measurements with the antenna up a mast.

The voltage and current sources can be fabricated relatively simply. Reasonable stability is required to ensure reproducible results.

The article in *Ham Radio* contains details of calibration and construction for a 144 MHz bridge. The technique is suitable for other bands.

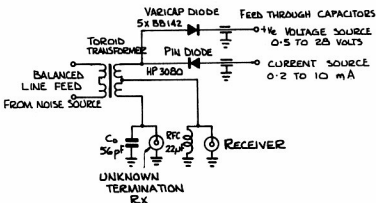


Figure 1.

SUBSCRIPTION OFFER SPECIAL BONUS GIFT!

SUBSCRIBE NOW!

You'll receive 12 issues of *Electronics Today International* delivered post free to your home or office and a free UBD Directory for your area* for only \$35.40. Simply fill in the details opposite to take advantage of this special offer.

*NSW, VIC, QLD, WA, indicate Capital City or State directory; NT will receive Touring Guide and Local Map; TAS will receive State Directory; SA will receive an Adelaide Street Directory & State Touring Guide.



In May ETI

- Crisis on the Shortwaves.
- Build a Midi Patch Changer.
- Community T.V. Is it possible?
- Computer Languages from Basic to Pascal.
- Satellites over New Zealand.

YES!

Please send me this special offer of 12 issues of *Electronics Today International* (one each month) along with my free UBD directory. NSW, VIC, QLD, WA. Please indicate:

Capital City ☐ or ☐ Country Directory
☐ I enclose my cheque/money order (with this form in an envelope) for \$

(make cheques payable to: The Federal Publishing Co. P/L)

Charge by ☐ Bankcard ☐ Mastercard
☐ American Express ☐ Visa with \$
(\$10% Discount for orders of 6 or more)

Card No. Expiry Date /

Signature
(unsigned orders cannot be accepted)

Mail Post Free in Australia to:

Freeport No. 4
The Federal Publishing Company
P.O. Box 227 Waterloo, N.S.W. 2017

Name:

Mr/Mrs/Ms/Miss Initial Surname

Address:

Post Code:

Date of Order: / / Telephone: ()

(Offer closes last mail June 30, 1987) ARMAR87

RNARS

Davy Inall VK4XX
PO Box 57, Zillmere, Qld. 4034

COVER STORY:

The accompanying photograph is of the WT Office aboard the, now decommissioned, HMAS *Diamantina*, which is located in the old Brisbane Dry Dock and forms a large and interesting part of the Queensland Maritime Museum Association.

Diamantina is a River Class Frigate, built by Walkers of Maryborough and launched in 1944. It was commissioned in 1945 and served in New Guinea and the Solomon Island waters, with the surrender of Japanese forces at Nauru, Ocean and Bougainville Islands being signed aboard her. *Diamantina* was acquired by the Queensland Maritime Museum Association in 1980, and since then a great deal of voluntary labour has been undertaken by members of the museum with the aim of restoring the vessel, as near as possible, to her original condition.

The WT Office now holds the amateur radio station of VK4RAN, and can be heard on the frequencies of 7010, 7020, 14020 and 14040, CW-only, most Wednesdays, Saturdays and Sundays. It is hoped that, as more operators become available/volunteer, the station will become fully operational on all open days.

The *Diamantina's* radio equipment consists of a TCA MF transmitter together with a TCA MF/HF transmitter with TCA receiver, with two receivers by Murphy (no not THAT Murphy!) of the B40 and B41 type. Antennas in use at present are the ship's wires, as the two tunable whips are not operable due to water-damage and the main transmitting whip has no control box.

Sad to say, the WT Office does not possess a Navy pattern Morse key (but would be most interested to hear from anyone with one to donate to a good cause).

The Museum is situated next-door to the EXPO 88 site, so it is anticipated that the Museum will see a marked increase of visitors during this period. The Museum (said to be Brisbane's best kept secret) is well worth a visit when you are next in Brisbane — or better still, why not become a member? The Museum has an ever-growing amount of Maritime Artifacts and Memorabilia.

BEACONS — REPEATERS

Tim Mills VK2ZTM
FTAC Beacon Co-ordinator
PO Box 204, Willoughby, NSW. 2068

At the Federal Convention this month, the Beacon Policy Paper will be presented for consideration. During the past year, only a few amateurs took the time to contribute to its preparation. It is somewhat disappointing that more people did not want to take part in policy-making for the hobby.

Although there are now about 240 amateur repeating systems and some 50 beacons in Australia, the requirements to establish these systems is misunderstood by many amateurs. In this column over the next few issues, some of the points to consider will be discussed. But first, some background.

The main QSP in February's AR detailed the revised co-ordination approach required by the Department. Although it as always been a role for the Institute to provide this function, the approach has differed in each State. The most important thing to co-ordinate is the frequency or channel to be used. In the beginning, for repeaters, there was only a broad outline with a couple of channels to be used and each State made its own allocations from them. (See Repeaters, Friend or Foe, AR 1985/86). As time progressed and systems approached State borders, some inter-region consultation occurred, but mostly it did not and the first known was a call book listing. The first beacons usually appeared on whatever crystal was available. A degree of band planning for beacons has seen them move to their own one-channel-per-system allocations. There will be some refinement to this approach on the completion of the beacon policy paper.

For repeaters, particularly two metres, the choice of the channel has to be carefully determined to minimise shared and adjacent channel interference. This task is made easier with the Federal Office having detailed data in the computer, which can be retrieved whenever a new application is to be assessed. An amateur repeater network differs from its commercial counterpart in that there is no restriction on user-access with respect to location or power used. Since some amateurs have a DX instinct and will work anything they hear, a reasonable geographical separation has to be maintained before the same channel should be reused. This has not always been done in the past and problems did occur, and still do. The pager network adjacent to two metres at 148-150 MHz, is also presenting an increasing interference problem which has to be addressed.

The voice repeater systems are as follows:

10 METRES — This is a new system for Australia. To date there is an experimental system in

Melbourne and Perth. Channels follow the USA approach in the sub-band 29.500-29.700 MHz. Four channels with 100 kHz offset. The current systems use split linked sites to overcome desensitisation problems.

SIX METRES — The band has set aside 16 channel pairs used once, with two allocations per call area. The offset was 600 kHz, but is being changed, as required, to the international 1 MHz standard. Currently there is a system in Perth, two in Melbourne, one planned in VK4 and two planned and being constructed in VK2.

TWO METRES — There are 31 channel pairs available with heavy and, in some cases, saturated use made in VK2, 3, 4 and 6. VK1, 5, 7 and 8, with smaller populations to serve, have confined their systems to the 146-147 MHz portion. The international 600 kHz offset is used.

70 CENTIMETRES — There are 60 channel pairs with a policy constraint to use only those channels ending in 25 or 75. An interference from two metre user transmissions concept, is no longer valid as all two metre channels are in service. There has to be checks made so as not to allocate a 70 centimetre channel in the same area which is a harmonic of a two metre system in the same region. The problem results in local user feedback. A 5 MHz offset is used, which is common to most parts of the world except Europe. In Europe they use either a 1.6 or 7.6 MHz offset. The band portion 433/435-438/440 MHz is mainly an Australian/New Zealand segment. The Europeans use 433/435 for the 1.6 system and 431/438 for the other. The Americans are above 440, but the loss of this band segment in Canada after WARC-79 and not being permitted in the USA within 80 km of the border has introduced changes currently being implemented.

23 CENTIMETRES — A new repeater band, and from Australia's point of view, not without its difficulties. The (Australian) major airport radar systems, centred on 1275 with a guard band, and the amateur satellite service sub-band 1260/1270 has meant it is not possible to use the Japanese originated 20 MHz offset. It has to be something less than 20 MHz, to fit the available segments. The band planning requirements were covered a couple of months ago in AR by Ron Henderson and Peter Gamble. The Australian plan uses a 12 MHz offset in the 1240/1260 MHz portion.

There are currently no repeating systems above 23 centimetres.

IAN J TRUSCOTTS

ELECTRONIC WORLD

FOR ALL YOUR COMPONENT REQUIREMENTS

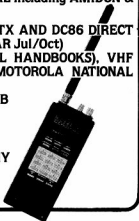
MAIL ORDERS WELCOME

30 LACEY STREET
CROYDON 3136

Phone: (03) 723 8860
(03) 723 3094

EXTENSIVE RANGE OF ELECTRONIC COMPONENTS FOR THE RADIO AMATEUR, HOBBYIST & PROFESSIONAL including AMIDON & NEOSID FERRITE PRODUCTS.

- STOCK DREW DIAMOND'S 4 WATT CW TX AND DC86 DIRECT CONVERSION RECEIVER FOR 80m (see AR Jul/Oct)
- AMATEUR REF BOOKS (RSGB & ARRL HANDBOOKS), VHF MANUALS, ANTENNA MANUALS & MOTOROLA NATIONAL DATA BOOKS
- FULL RANGE 27 MHZ & 477 MHZ CB RADIO & ACCESSORIES
- UNIDEN SCANNING RECEIVERS
- COMPUTERS
- WELZ TP-25A 50-500 MHz DUMMY LOAD — POWER METER



SIMPLE ANTENNA TUNER

E C Brockbank VK2EZB
115 Myall Road, Cardiff, NSW, 2285

This simple antenna tuner is not intended to be a cure all.

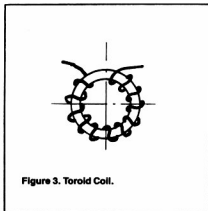
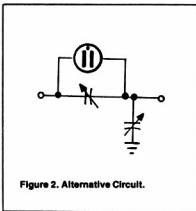
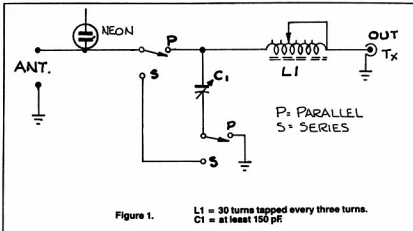
In fact, the tuner configuration is standard and possibly the only variations are the toroid former and the neon indicator. Although neons do not appear to be common in amateur antenna tuners, they have been used in other antenna tuner fields. The tuner is meant to be used in conjunction with the so-called "random length of wire" antenna.

As most amateurs would know, when camping out in the "Mulga", one does not simply use a so described length of wire. The so-called "random length" would be closer to either a quarter or half wave at the frequency of operation — or the harmonic of it. This would only leave a decision of series or parallel tuning, fundamental or harmonic.

As with all end-fed antenna wires — the tuner *must* have a good earth. This practice is normal, due to the high voltage/current relationship present at the output of the tuner. One final refinement is the neon bulb in the tuner output lead. Only one side of the neon is placed in circuit and when the tuner is in some semblance of load condition — the neon will glow brightly. The neon also doubles as a modulation monitor.

The type of neon used is dependent on output power. Small neons and broadcast band types of variable capacitors are okay for low power units such as the FT-7. Wider spaced capacitors and larger neons would be required for a higher power rating. The coil consists of 30 turns, spaced on a toroid former. The coil is tapped every three turns and can be mounted directly to a 12 position switch. The two position switch can be engaged for series or parallel operation. When searching for the correct settings, vary the tuning capacitor will cause a quick flash as the circuit passes through resonance.

The entire construction may be enclosed in a small metal box. End feed a half wavelength of wire on the frequency in use and use a good earth and you cannot go wrong!



Check out the experts for **YAESU AMATEUR and COMMERCIAL TRANSCEIVERS.**

Need spare parts or accessories for your **YAESU?**
We carry a wide range of these for **NEW/OLDER MODELS.**



For EMOTATOR ROTATORS — KATSUMI ELECTRONIC KEYS — HIMOUND MORSE KEYS — HIDAKA HF UHF & VHF ANTENNAS

SPECIAL PRICES FOR 70 cm TRANSCEIVERS WHILE CURRENT STOCKS LAST.

CONTACT BAIL ELECTRONICS

SPECIAL



FT-703R \$395; FT-709R \$484 — both with FNB-4 12V NICAD and Charger.
FT-770RH 25W FM Mobile \$749.



BAIL ELECTRONIC SERVICES
38 FAITHFUL STREET, WANGARATTA 3677

Telephone: (057) 21 6260

Mail Orders, Mastercard, Visa and Bankcard Welcome.

Stan Roberts
and Staff —
VK3BSR

CLASSIC COMMUNICATIONS EQUIPMENT

Colin MacKinnon VK2DYM
52 Mills Road, Glenhaven, NSW. 2154

The TR-AP-21-A TRANSCEIVER

"L'émetteur-recepteur UHF léger de bord type TR-AP-21-A" is a low power transceiver assembly built by the French company, "Omera- Segid" for aircraft use in the military UHF band.

The unit consists of the transceiver, ER-76 A, a converter power supply, BA-220 A, and a control box, BC-148 A.

The sets were designed around 1960 and were fitted to the Mirage III fighters purchased for the RAAF. They have recently been replaced by solid-state Collins radios.

Technical specifications are as follows:

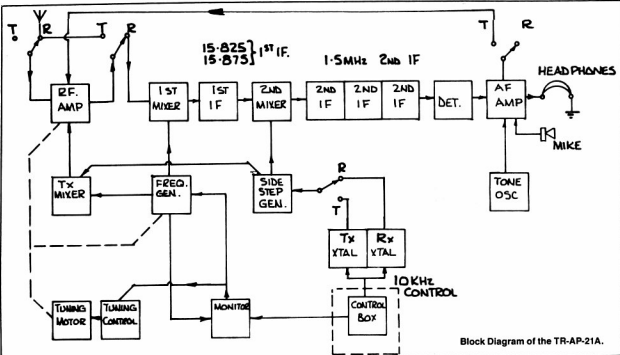
Frequency Range	225 to 399.95 MHz
Channel Spacing	50 kHz minimum (RAAF used 100 kHz)
Stability	± 20 PPM (about 6 kHz)
Preset Channels	20 — using the BC-148 A control box
Power Required	28 volts DC at 10 to 15 amps
Power Output	3 to 5 watts (depending on frequency)
Modulation	Amplitude modulation and tone (MCW)
Weights	ER-76 A . . . 11 kg BA-220 A . . . 3.4 kg BC-148 A . . . 1 kg

Limitations

± 10 G acceleration
+ 70 degrees Celsius to -40 degrees Celsius

As well as transmission and reception of voice and MCW, the set includes an intercom

Partial view of the unit. Blower fan can be seen at the top-right, preset controls are behind a movable panel with the makers badge on it. The N-connector for the antenna lead is to the right of the VHF plate.



Block Diagram of the TR-AP-21A.

facility and a digital mode, but these features were not used by the RAAF.

A companion assembly called the TR-AP-28 A, with an ER-78-A transceiver, covered the VHF band between 100 to 156 MHz. It is identical in external appearance but has a different RF front end and different IF unit. It was not purchased by the RAAF and although some RAAF units have a plate marked "VHF" on the front, they are, in fact, standard UHF sets tuned to the low end of the UHF band. I believe that this provided a choice of a "low band" or "high band" channel arrangement as required by particular operational needs, with one set available covering 20 lower frequency channels, and the other another 20 channels further up the band.

In service, the sets were used for air-to-air communications and some air-to-ground contact. The range depended on the aircraft altitude and up to 400 kilometres-range was possible.

The transceiver is constructed with an aluminium frame, with removable upper and lower covers, into which a number of sub-assemblies fit and connect. A cooling fan is mounted on the top front, as the temperature inside the aircraft can be very high. Also on the front are connectors and controls to allow bench or in situ testing of the unit. The main interconnection to the aircraft harness is on the rear panel, and electrical contact is made as the set is pushed into a shock-mount frame in the aircraft.

The radio contains 40 subminiature, ruggedised valves, and is conventional in design, although obviously much attention has been given to ensure reliability and ease of servicing.

Refer to the block diagram in conjunction with the following description of operation.

On reception, the input signal is transferred via an unconventional design of T/R relay to two RF amplifiers and thence to a mixer diode, to which is also applied the mixer frequency to achieve a first IF frequency of either 15.825 or 15.875 MHz. This rather unusual selection allows for the 50 kHz channel spacing (the difference between the two IFs is 50 kHz).

The IF signal from the first mixer is amplified and applied to the second mixer where it is mixed with a signal from the side-step oscillator to give a resultant 1.5 MHz second IF frequency. The side-step oscillator is so-called

because it generates each of the four frequency steps needed for the 50 kHz difference between channels for reception and those needed for transmission.

There are three second IF stages, followed by a diode detector which also provides an AGC signal. The resultant audio signal passes through a diode noise limiter to a preamplifier and audio amplifier stage consisting of a phase shift amplifier to two pentodes in push-pull. A squelch circuit at the detector relies on the AGC signal to allow stronger signals to pass to the audio stages.

On transmit the audio stages are used as a microphone amplifier which feeds to the RF stages where the RF amplifiers now act to amplify the transmit signal. A transmit oscillator signal from the frequency generator to a transmit mixer controls the output frequency.

The correct frequencies are provided by a phase lock-loop frequency generator, controlled by the "monitor." Unlike modern IC dividers, this unit has a multiplicity of crystals in crystal ovens which are selected by rotary Lodox switching in accordance with the channel setting of the BC-148 A control box.

The operational details of the frequency generator and monitor are quite complex, involving harmonic generators and additive mixing of four different oscillators using a total of 32 crystals! A comparator, or discriminator, generates a sawtooth wave which in turn controls frequency correction circuitry.

The monitor also provides a signal to thyatrons which release a braking mechanism, switch a motor on and adjust its speed. This motor rotates a variable capacitor gang that tunes the RF amplifiers. When a new frequency is selected the motor is activated and rapidly rotates the capacitor gang to the new tuning position. It actually allows the tuning to go past the correct point, due to the inertia effect, then reverses and turns back at a slow speed until it is in tune. The brake then holds the tuning gang at that position.

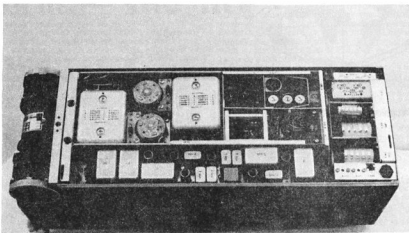
The specifications state that it takes no more than six seconds to settle on any new frequency channel!

The control box BC-148 A allows 20 frequency channels to be preset and then selected via a rotary switch. It also controls the volume and on-off functions. Note that the part number of the controller is to an international system as the same control box can be used with other makes of UHF radios.

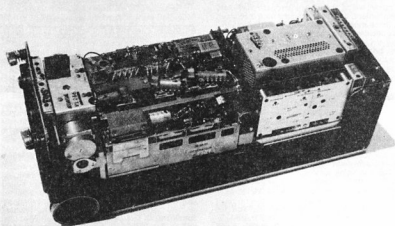
The power supply BA-220 A comprises a rotary converter or dynamotor providing 250 volts HT, and a regulator to give 20 volts. As well, it has relay switching for the crystal oven heaters and filaments. In the set itself the 250 volts is dropped to 125 volts and regulated for the oscillators and RF amplifiers.

The ER-76 A has appeared on the surplus market, along with various specialised test equipment to suit, but I have not seen any BA-220 power supplies, and I believe the control box may still be in use.

A high power UHF transceiver from the same source, the TR-AP-22 will be described next month.



Top view with the covers removed.



Bottom view.



VHF - HF - an expanding world

Eric Jamieson VKSLP
1 Quinns Road, Forrester, SA. 5233

All times are Universal Co-ordinated Time and indicated as UTC

AMATEUR BANDS BEACONS

FREQUENCY	CALL SIGN	LOCATION
50.010	JAZ2GY	Mie
50.060	KH6ED	Honolulu
50.075	V56SIX	Hong Kong
50.109	J1Y1AA	Minami Tori-shima
50.213	P29PL	Lobos Island
50.210	ZL3ME	Normes
50.220	FK8A	Niue
50.235	ZK25IX	Macquarie Island
50.215	VK0DS	Darwin
50.220	VK0VF	Manawatu
50.225	ZL2VHM	Honolulu
50.230	ZL3ME	Honolulu
50.320	VK8RT	Wickham
50.325	VK2RHV	Newcastle
50.345	VK4AB	Longreach
50.350	VK8TU	Kalgoorlie
50.370	VK7RST	Hobart
50.408	VK0MA	Mawson
50.420	ZK2RSY	Sydney
50.425	VK2RNB	Gunnedah
50.435	VK3RMV	Hamilton
50.440	VK4RTL	Townsville
50.450	VK5VF	Mount Lofy
50.460	VK8PH	Perth
50.465	VK8TW	Albany
50.470	VK7RNT	Launceston
50.485	VK3RAS	Alce Springs
144.019	VK8RBS	Busselton
144.400	VK4RTT	Mount Mowbrum
144.410	VK1RC	Canberra
144.420	VK2RSY	Sydney
144.430	VK3RTG	Glen Waverley
144.465	VK8TW	Albany
144.470	VK7RMC	Launceston
144.480	VK8VF	Darwin
144.485	VK3RAS	Alce Springs
144.550	VK3RSE	Mount Gambier
144.565	VK8PB	Port Hedland
144.600	VK8RT	Wickham
144.800	VK5VF	Mount Lofy
144.950	VK2RCW	Sydney
145.000	VK8PB	Perth
432.067	VK8RBS	Busselton
432.160	VK1RC	Canberra
432.410	VK8RTT	Wickham
432.420	VK2RSY	Sydney
432.440	VK4RBB	Brisbane
432.445	VK4RIK	Cairns
432.450	VK3RAI	MacLeod
432.535	VK3RMB	Mount Buninyong
432.540	VK4RAR	Rockhampton
1296.171	VK6RBS	Busselton
1296.420	VK2RSY	Sydney
1296.480	VK8PB	Niue
10300.000	VK8RVF	Reykjavik

1 Mark VK0AQ, at Mawson, recently reported the VK0MA Beacon is operational most of the time. Off periods are caused by local power failures and, sometimes, the long trek to the beacon site through soft snow is not always welcome, so it can be off for a few hours or even a day or two, depending on circumstances. Other than power failures, it now seems quite reliable and runs about 70 watts and is on 62.408 MHz.

THE ROSS HULL CONTEST

So much for my recent extinctions! Only one letter on the subject arrived this month, being from Norm VK2XCI, who, amongst other things, has the following comments.

Norm believes the timing of the contest is a "bone of contention". He realises December/January is the best period for ES, but it does fall into the middle of a holiday period and many operators are away from home. (True — but then many operators are also not working and are home ... 5LP). He considers a Ross Hull Field Day Contest has some merit, perhaps a field day period at the beginning, middle or end of the contest, either as a separate contest (as with the

present two day/seven day set-up) or giving bonus, extra or multiplier points for the contest proper. Then those who may be away and have portable equipment with them might be encouraged to have-a-go.

The present duration allows for some good, even spectacular propagation at some time over the contest period, but Norm says some people have to work their holidays around the two day period, perhaps months in advance. He says in HF contests the operators don't get any chances to pick the eyes out of their operating periods!

Why not a separate award for each band, with the best score in any one band taking the trophy? This would give the "monobanders" a real chance to win. The current excellent scoring system could probably be retained; it appears to be quite equitable.

Norm summarises by saying he would like to see a shorter contest with a nominated "high activity" (eg field day), period during the Summer/Estrope period, but outside the December 24 to January 2 period.

Thanks for your thoughts Norm. Maybe they will generate some comments.

EME REPORT

I was saddened to read in the March 1987 special edition of *The Propagator* the monthly newsletter of the Iliwara Amateur Radio Society, that, after 17 years of moonbounce (EME) operation, the VK2AMW Moonbounce Project has ended.

It did not end due to any lack of enthusiasm on the part of the participants, but due to the theft of almost every piece of equipment and cables attached thereto.

The lock on the door to the operating building had been broken to make entry. All the equipment used in the installation was removed, also the large dish control cubicle with all its equipment, two metre steel shelving units, etc, which must have required several men and a truck to move it from the site. All the RG213U and RG58U coaxial cables, which ran in underground conduits between the building and the dish structure had been pulled out, together with the multicore control and power cables which followed the same route. A few small items remained, but in general, the building had been "cleaned out" as far as their vital operating and ancillary equipment was concerned.

An assessment was then made of the overall security situation and of the large amount of work and money which would be required to rehabilitate the equipment, and these matters were discussed with those most involved. Finally, and reluctantly, it was decided that rehabilitation was not feasible.

The VK2AMW project was carried on first at Dapto between November 1969 and April 1978, when the project was moved to the present site at Mount Keira following severe vandalism to the 432 MHz EME equipment. The project came on air after the move in June 1982 and, in that interim period, Lyle VK2ALL, spent much of his time in the design and construction of the 1296 MHz equipment.

The first of the Moonbounce articles were included in *The Propagator*, December 1969, and Lyle said the March 1987 issue may include the last reference to the project. However, he believes there are new frontiers to be looked at, and it may be possible for even higher frequencies to be tried for EME and using smaller dishes and suggests he is interested in trying to hear VE7BBG using his own six foot dish on 1296 MHz for the time being.

I take this opportunity, on behalf of the VHF/HF fraternity, of saying how sorry we are that such a great project should have to end under such circumstances. We can only hope that fellow amateurs have not been involved in the thefts and the equipment has not been taken for its cash value

and not to be set up and used by someone too tired to construct the necessary equipment themselves.

Over many years I have read with interest the "EME Report" in *The Propagator* and frequently I would be able to take extracts from the notes so written to inform the amateur VK2AMW, in general, what was taking place at VK2AMW. I thank those involved for the opportunity to do this and to say how pleased I have been to receive the newsletter so promptly each month, and hope it will continue to come to my desk.

In the meantime, we all say, congratulations to VK2AMW and its faithful band of operators and workers and, despite the present situation, you have made a number of achievements of which you can be proud so there will be some satisfaction. Well done!

TWENTY-FIVE YEARS

Congratulations to Iliwara Amateur Radio Society which, in 1987, celebrates 25 years of activity. The March 1987 issue of their newsletter, *The Propagator* was a special bumper issue with extracts of proceedings from 1962 through to 1977, all of which makes nostalgic reading and will serve as a historic reference in the future. I hope the remaining 10 years will be covered in a future issue, the present March issue ran to 32 pages and is an issue which should be filed away for later use.

It was the first 432 MHz echoes were received from the moon on March 31, 1972, by VK2AMW, and then the successful contact between VK2AMW and WA6HXW on April 19, 1972.

All of this is of particular interest to me as I actually visited the EME site at Dapto in the company of Lyle VK2ALL, during the 1970s, and took some photographs of the dish and its construction as I was interested in building one at the time.

THE WORLD ABOVE 50 MHZ

That is the title of the pages written by Bill Tynan W3XO in QST and I was particularly pleased to receive his copy for the March 1987 issue as it refers in some detail to the updating of terrestrial DX records. I would like to list the records first and follow this with some of his comments.

TERRESTRIAL WORLD DX RECORDS

BAND	CALL SIGNS	DISTANCE Miles (Kilometres)	DATE
6m (50 MHz)	JHSHTPB & PY5BA/B's	12 413.7 (19 977.9)	Mar 11, 1982
2m (144 MHz)	HEAT & Z53B	4882.9 (7785.2)	Mar 31, 1979
1.25m (220 MHz)	KP4EQR & LU7DJZ	3677 (5917)	Mar 9, 1983
70cm (420 MHz)	KH8IAA/KH6 & K0BR	2554 (4111.2)	Jul 28, 1980
33cm (902 MHz)	W2PGC & K3SIW	480.8 (773.7)	Dec 24, 1986
23cm (1240 MHz)	W6NMT & KH8HME	2532.5 (4075.7)	Aug 13, 1986
13cm (2300 MHz)	VK8WG & VK5QR	1170 (1883)	Jan 17, 1978
9cm (3A GHz)	VK5QR & VK8WG	1171 (1884.6)	Jan 25, 1986
5cm (5.7 GHz)	G3ZTZ & SM0YVZ	610.3 (982.2)	Jul 12, 1983
3cm (10 GHz)	IO5NYEA9 & IOYLVE9	1031.5 (1660)	Jul 8, 1983

1.24cm (24 GHz)	HBRER, HACHYB & I350V3, W3EHQ/3	179.6 (289)	Apr 25, 1984
63mm (47 GHz)	H8SAMH & H8SMIN	33 (53)	Jun 11, 1984

Bill WX3O, states that having acquired a new computer program to replace the spherical earth model used previously, he now has a program which takes into account the true shape of the earth, and the distances listed are calculated based on the closest distance between the two stations, as determined by their geographical co-ordinates or grid locators without regard to the distance actually covered by the signals getting from one station to another. This approach heads off the arguments such as "our contact was long path," "bent path," or "mountain bounce" etc.

Bill believes the table is up-to-date, but is always open to comments and corrections if errors have been made or if someone has information regarding new records. It appears no new records are known to him for six metres, two metres, one and a quarter metre, 70 cm since those published in September 1984. The small differences from the distances then published are due to recalculation with the new computer program.

For the new 33 cm band, W1JZR says the contact between W2PGC and K3SIWV appears to be the record and occurred during a major trop opening over much of the eastern half of the US.

The outstanding trop event that occurred late in November 1986 produced new North American overland records for the 70, 23 and 13 cm bands, but no new world records. The best 23 cm DX was between WB3CZJ and two Dallas-area stations, WB5LUA and KD5RO — a distance of 1290 miles (the US still uses miles — .5LP). With KD5RO about 1600 miles further south he gets the record WB3CZJ to work these and other nearby stations on 70 cm, including WA5VJB, at approximately 1320 miles. On 13 cm, contacts between WB5IO and WB5LUA, at 934 miles, and KD5RO, about 940 miles, apparently tops all previous overland work on this band anywhere in the world. However, the 13 cm world record remains where it has been for nine years, with VK6WVG and VK5QR, for their over water work across the Great Australian Bight.

A new 23 cm record has recently been claimed by WB6NMT and KH6HME, slightly bettering the mark previously set by N6CA and KH6HME.

According to information received from SM5AGM, the keeper of the Region 1 records, the nine centimetre record previously reported held by two New Zealand stations, was eclipsed in July 1983 by G3LOR and SM6HY. The world record for this band is held by VK5QR and VK6WVG, who have again demonstrated what their part of the world is capable of producing in the way of tropospheric propagation by setting the current mark for this band as well.

Bill says that the same pages he came to his attention for the 10 GHz band; information from SM5AGM lists a new European record for 24 GHz between two Italian teams and an apparent record for the 47 GHz band by a pair of Swiss so, in the absence of any other claims, Bill, at this time, considers they represent the world record.

Also, from the same pages, the 1.05T is the 70 cm standard was changed EME, as I believe this would be a truer indication of the range of contacts. For example; a station might have worked only 15 States without the aid of EME but, because he has the EME facility, is listed as having Worked All States. This is not meant to downgrade EME contacts by any means, it is just so a total comparison can be made. The station with the greatest number of States worked with EME is listed as W3ATW and 33 states and 11 call areas, followed by WB9SNR with 34 states and 11 call areas. Both of these stations and many others with 20 or more States should be congratulated

for their commendable efforts.

Two other items from Bill's pages — G4UPLS (formerly ZD8TC) summarised last year's six metre EME activity in Europe by saying there are a number of Continental stations prepared to listen on six metres and reply via 28.885 MHz.

The other item concerns K6QXY, who has now erected an array for six metres consisting of four 175 wavelength, 10 element Yagis, spaced 28 by 24 feet and is now actively looking for six metre EME scheds.

FROM WEST AUSTRALIA

The Western Australian VHF Group Bulletin has a few interesting snippets of information which are worth mentioning to readers. Firstly, a VK6 call sign was heard on two metres in Cairns on 20/2/86. Although no contacts were made, it shows such are possible given the right conditions.

Dave VK6AOM, of the Esperance Amateur Radio Society, reported on the WIA News Broadcast that, on 8/2/86, from 0700 to 1400, he worked 18 VK3s and nine VK5s on 144.100; and six VK3s and VK5s on 432 MHz.

At 1038, he had the pleasure of working David VK7DC, at Burnie, Tasmania, a distance of more than 2000 km. Signal reports were 5x/2.3 each way on two metres. 432 was tried at that time without success. From that time on, attempts at 1200 and 5x/3 reports were exchanged. These are understood to be the first ever VK6 to VK7 contacts on two metres and 70 cm. This QSO ended in a four-way contact with VK3AJU and VK5NC joining in. Conditions were so stable that VK7DC was still good copy at 1400 when he closed down. As a bonus, VK6AOM had worked six VK3s on six metres earlier in the day.

In the same news was a report from Bob VK6BE, at Albany, and the Southern Electronics Group, who said the bands opened there during the afternoon and continued until late evening. Contacts from Albany were made to VK5 and VK3 on 144 and 432 MHz, while Wally VK6WG, worked his SHF friends on 3 GHz. Apparently an attempt on 5 GHz did not materialise.

During the same opening, Aub VK6XY, in Albany, was able to work through the Geelong two metre repeater with only a two metre hand-held and rubber duckie antenna!

The friendly rivalry between Esperance and Albany seems to be encouraging a very healthy increase in activity in those areas, which certainly is a claim to be the VHF capital of Western Australia; the report suggests that Perth stations should be doing something positive to get into the act again.

Also, from the WA VHF Group Bulletin is information that the Perth six and two metre beacons are at present operating from the top of a hill in the Nedlands area apparently owned by the Government. Eventually, the hope is to reinstall the beacons transmitter inside the TVWV transmitter house, and to run their own feeders up to the antenna. Two lengths of old Helix cable have been donated for this purpose and their condition is presently being assessed.

THE UHF/SHF BANDS * *

It rather distresses me to continue to be hearing around the bands that the Department of Communications has discussed, with the Executive of the WIA, a proposal to withdraw the complete 13 cm (2304 MHz) band from the Amateur Service to make way for the VHF capital of Western Australia (a commercial operation) and that the WIA did not oppose such action!

Now I am fully aware that some information discussed on air can be altered from the original by passage from mouth to mouth, but it seems there is a semblance of truth in the statement when a known person reports that the Department has said to Wally VK6ZJ, it is necessary to write to DOC, the WIA, ARA, and VKSLP for starters, trying to establish with certainty that such a proposal has been discussed.

What we do know with certainty is that in Western Australia the Syledis radio location system has forced Perth amateurs to modify their ATV equipment to a higher frequency in the 70 cm band and that television relay equipment was used in the 13 cm band during the America's Cup.

Apart from the ramifications of the attack on the

70 cm band, the possible loss of the 13 cm band is really bad news for the Amateur Service. One needs to agree that there is not a great deal of use made of that band but that gives no reason for the complete removal of the use of the band by amateurs. More equipment is slowly becoming available to amateurs for use on that and higher frequencies and the continuing provision of at least a reasonable portion of all bands would not be an unreasonable request. It is possible to dispel any incorrect statements that might be circulating, the WIA should at least make a statement indicating whether such discussions have occurred or are occurring, and whether they have agreed, in principle, to the removal of the 13 cm or any other bands from the Amateur Service, and with whom they have consulted.

The present issues comes very close to that which I remember in the 1950s when the loss of the six and two metre bands to television seemed likely and only the combined efforts of the then VHF operators ensured frequencies in those bands for those amateurs who were to follow.

It seems to me that the continuing situation of the Amateur Service being the second best service in many of the UHF and SHF bands, there will be continuing conflicts between the amateurs and commercial interests. Perhaps the allocation of a fair segment of each band for the exclusive use of the amateurs would be better than the present shared system even though this would probably result in a loss of the fairly wide bands we share at present. The present system of allocation, if such could be achieved by open discussion with all parties it might achieve more than having all discussions behind closed doors without any advice of the outcome.

However, I do see some encouragement for the future in the report, *Amateur Radio* February 1987, page 23, column three with Mr David Hunt, the managing director of the UHF and SHF state, who said it is important that the state should be continuing technological developments to happen — allow the amateur service to become part of the progress of technological change. We wouldn't want to impose any restrictions on the amateur service to not experiment and develop new techniques in the community and the state would also apply to the amateur service being allowed to continue its experiments in those bands allocated to it and not be under constant threat of removal purely in the interests of commercialism.

I commend Wally Howe VK6ZJ, for his initiative and give him my support. Will you, the readers, do the same?

BAND CONDITIONS

Six metres still has the occasional flutter into activity via EME, mainly concerning VK2 and VK4. Channel 0 has been very strong on a number of occasions, but no signals could be raised at its end, presumably no one was listening.

On two metres, I am still without a rotator and likely to be for another month it seems. I never believed one could be so lost without that band. To make sure I had not missed anything too important, I contacted Mick VK5ZDR and he informed me that morning contacts into VK3 were being made on a generally continuing basis on two metres. The best morning lately was on 1/3 between 2130 and 2230, when he worked VK3s ZL, DFI, KEG, AUJ and AZG, all on two metres and VK3AJU and VK3KEG on 70 cm. Signals generally were very good.

Mick also said after almost 20 years, he finally caught up with that long time VHF operator, Ian VK3ALZ, who was operating from Mount Macdonald (portable) using a quad antenna on the car and enjoying a pleasant evening on the mountain. Mick recalled about the last time he worked Ian was in the 1960s on 70 cm. Ian's VK3ALZ also had a member of the club using two QOE06/40 valves in a two metre amplifier. This is really equivalent to having four tetrodes in the amplifier and they took some taming, but were capable of plenty of power if you got them going properly.

SIX METRE STANDINGS

The next list is scheduled to appear in August 1987 and I would like entries/updates to be on my desk by May 31, to allow time for processing.

Claimants are requested to supply the following details:
Date of Contact, Time in UTC, Call Sign of Station Worked, Country, Mode, Report Sent and Received, QSL Sent and whether received. Split Frequency Contacts should be indicated. Please add you own call sign, signature and date of claim. I reserve the right to ask claimants for QSL cards for pursuit to support verification if considered necessary. If you have worked five or more countries (including VK) you are eligible to be entered on the list. You may never catch the high scorers, but don't let this worry you, it can be fun watching your own results gradually creep up the ladder!

MACQUARIE ISLAND

Gil VK3AJU, sends some information from Sojo VK0SJ, who provided many stations with their first VK0 contact whilst on Macquarie Island. A computer print-out gives a total of 150 different VK stations worked plus 20 ZL stations. A number of these stations were worked several times. The contacts to the various call areas were: VK1 2; VK2 16; VK3 73; VK4 13; VK5 12; VK6 3; VK7 28; VK8 5; ZL2 8; ZL3 10; ZL4 2. These contacts were all on six metres. (I have never seen such a long list of VK7 stations, to make 28 a lot must have come out of the woodwork just to work Sojo I wonder where they are normally? ... 5LP)

In addition, Sojo worked 10 stations on two metres, being VK3s AMZ (first contact), AQR, AUU, AWY, AZY, BRZ, DUT, XQ and XEX (who was the longest distance at 2174 km).

The longest distance on six metres was John VK4FNQ, at Cairns, a distance of 4300 km.

Gil VK3AJU, commented in his letter that we had been very lucky with Macquarie Island as we have had some very dedicated operators. "Peter got up and going in spite of problems and then David and Sojo gave things a good push. Lots of stations were able to get a VK0 contact."

Gil also says "The summer was really something with lots of DX. The two metre opening to Macquarie was good. Pity I missed it. Still, I am glad it has been done. The gear has come back.

Hope some others get inspired to give it a go in the future.

"I feel there is a lot of DX to be worked on 6, 2, 432 and higher. All we need are people willing to have a try. Many of the islands could yield quite exciting contacts. I hope Heard Island might get a base as I feel it has a good chance with a keen operator."

"As to operators for odd spots, I think they have to be highly motivated. This really helps to get things going. Complete station gifts or loans are not much use if the operator isn't keen. The more the operator is willing to contribute the better the chance of success." Thanks for that nice parcel of news, Gil ... 5LP

OVERSEAS

From *The Short Wave Magazine* (kind favour of VK5AIM), is an interesting comment in the January 1987 issue regarding OSCAR-10, as quoted in the UO-11 Bulletin.

"All efforts to this date have concentrated on using the first 512 bytes of the IHU memory, since this is the memory into which the 1802 computer will automatically load uplinked data. Through the unflagging efforts of the AO-10 command stations (DB2OS, ZL1AOX and VK5AGR), the whole 14 kbytes of the IHU memory were tested. Several blocks of the higher memory were in much better condition than the lower area. If programs can be loaded into this higher memory, there is hope of bringing the satellite further under control."

"Anyone who has 'peeked and poked' into a computer's memory knows what a tedious and lengthy business it is. So, hats off to those who have been doing this remotely at anything up to 40 000 km range. It proves that radio amateurs are every bit as resourceful as the professionals concerned with the remote control of spacecraft." (This is in line with the DOC Manager, Mr Hunt's comments previously mentioned).

CLOSURE

Not a lot of local activity to report as you have noted, but I seem to have found a fairly wide ranging series of subjects for your reading.

I would still like to hear from more readers of their amateur activities and if you can send relevant photographs these would be appreciated.

As we will have passed through the equinox by the time you read this, the next period to devote some attention to is the winter E which often comes along during June and July, especially on six metres, so keep an ear on the band and make some calls.

Closing with two thoughts for the month: *There is a way of transferring funds that is even faster than electronic banking. It's called marriage!* and *My life is in the hands of any fool who makes me lose my temper.*

—73, The Voice in the Hills.

* THE WIA HAS NOT GIVEN AWAY 13 CM

Contrary to the opinions being expressed in various places recently, the WIA has not given away the 13 cm band. At a recent meeting with DOC where this band was discussed, a copy of the documentation relating to Multipoint Distribution Services was obtained. This is currently being studied and a submission will be made to the DOC on this matter.

Multipoint Distribution Services (MDS) are radio communications services which provide for one-way transmission of information, either broadcast quality, video/audio or data. Normally, omnidirectional antennas are used. There are five existing MDS channels in the 2076-2111 MHz band and DOC proposes to allocate a further 14 channels in the 2300-2400 MHz band. In this band fixed, mobile and radio location services are the primary users, while the amateur service is a secondary user.

If any amateur has any comments or suggestions on this matter would they please forward them URGENTLY to me, care of the Federal Office.

—Peter Gamble VK3YRP
Chairman FTAC



International News

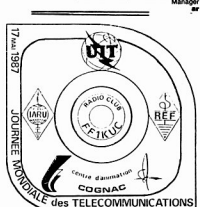


SOLOMON ISLANDS RADIO SOCIETY



DXers are urged to send their QSL cards direct to a H44 station or the H44 QSL Bureau as QSL bureaus in some areas have been known to delay H44 cards by years due to the low volume to H44 — by which time the operator has left the country.

—Contributed by Andrew H44AF, Solomon Islands QSL Manager



RESEAU DES EMETTEURS FRANCAIS
The amateur radio club of the city of Cognac
(Département de Charente, France) and the

National Society Réseau des Emetteurs Français, will commemorate May 17, 1987, with exhibitions and demonstrations of many radio amateur activities including the reception of television via satellites, on the occasion of World Telecommunications Day.

For this day there will also be a philatelic exposition about the following topics:

- ITU and World Telecommunications Days.
- WCY 1983 (World Communications Year).
- Amateur radio, broadcasting and television.
- Microwave telecommunications and satellites.
- Inventors and users in the field.
- The telephone.

A special philatelic, four colour cover will be franked with an illustration post mark of the French PTT, especially issued for the occasion. Price for one cover is FF10 (plus postage and packing) or 6 IRCs (including post and pack). Requests are to be sent to Raymond Aupetit 14, Residence Bois Boutin, F-6340 Lisle D'Espagnac, France.

All other information or requests for any amateur radio demonstrations or philatelic exposition may be obtained for one stamp or one IRC — address as above.



The Solomon Islands QSL Bureau has been resurrected and is not operating. It has over 2000 QSL and SWL cards for former H44/VR4 stations. Most H44/VR4 stations have been expatriates who were in the country for only a couple of years, at most. There are consequently no forwarding addresses.

Any former H44/VR4 stations or anyone who knows of a former H44/VR4, are asked to write to the Solomon Islands QSL Bureau, Box 418, Honiara, Solomon Islands with the information. Photocopies of QSL cards received from former stations are also helpful as they frequently give the name of the operator, home country call signs and/or addresses, and alternate QSL addresses.

There are over 1000 cards in the bureau for Anthony Bryan Sturm ex-H44IA, ex-P2BIA, ex-ZL2IA. Any information about him would be gratefully received.

Novice Notes

CHEAP RADIO — THE 'JUNK BOX'.



Drew Diamond VK3XU
Lot 2, Gatters Road, Wonga Park, Vic. 3115

A significant number of technical articles today still refer to a mysterious receptacle called the *junk box*. Newcomers with an interest in constructing on a limited budget may ask where the material to stock this junk box is obtained (the answer will probably be some vague reply like "just collected it over the years — you know").

It is now over 10 years since colour television was introduced here, and many receivers bought back in 1975 are now beginning to look a bit sad. The cost of a new picture tube generally prohibits an economical repair, and so the poor set — once the family's pride and joy, is sent to the rubbish tip.

These junked sets represent a gold mine of parts for the technical amateur (see photo 1). Let me list some of the more potentially useful items obtainable: Power transformer (often rewindable. The ones with a divided bobbin are particularly good), coils, transistors, diodes, capacitors, resistors, potentiometers, trimpots, valves (in the really old sets), 4.43 MHz crystal, knobs, winding wire (from deflection coils), EHT transformer (for balun core), plugs, sockets, screws, nuts, speaker, etc.

Assuming that you have managed to find an old set by some means, start by vacuuming out the accumulated dust. Avoid any rough treatment of the tube, and it would be prudent, if possible, to leave it mounted in the chassis or cabinet for ease of handling and disposal later.

It would be wise to trace and note the connections to the power transformer for future reference, as some are not marked. At least the primary mains connection should be identified and recorded. The individual boards and any other useful items can now be removed (photo 2).

Riveted components can generally be extracted by carefully drilling out the pressed part of the rivet with a sharp drill of slightly larger diameter (photo 3).

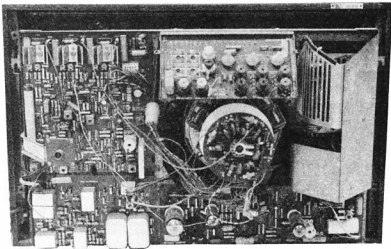


Photo 1.

Some purists may question the advisability of using recycled parts in this manner. It must be remembered however, that we are amateurs, answerable only to ourselves. In addition, a great deal of satisfaction can be obtained in building equipment cheaply, by adapting components and "cobbling up" a project, rather than by precisely following a published design. Naturally, used parts should be checked (as far as possible) before reuse. Suspicious looking components, such as discoloured resistors or cracked capacitors should be discarded, even if they appear to check okay, as their long-term reliability will be poor.

SOME FURTHER READING AND RELATED PROJECTS

GREENHAM, VK3CO. *Home-Brew Regulated Power Supply* AR, July 1985.

HAYWARD & SON, WZTOI. *The 'Ugly Weekender'*. QST, August 1981.

MARRINER, W6XM. *One Tube 10W CW Transmitter*. CQ, June 1983.

DEMAW, W1FB. *The Fine Art of Improvisation*. QST, July 1985.

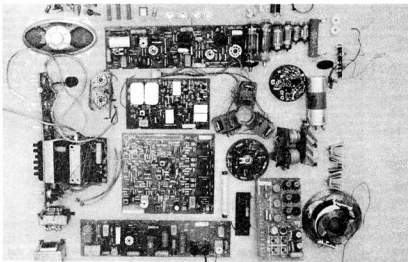


Photo 2.

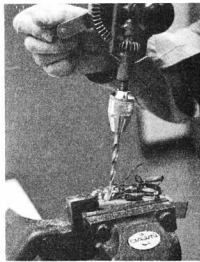


Photo 3.



How's DX?

Ken McLachlan VK3AH
Box 39, Moorookbark, Vic. 3138

Well, apparently the propagation is not as bad as amateurs tend to believe, although in VK there has been a noticeable decline of activity compared with the same period of last year, particularly on the low frequency part of the amateur spectrum. The ARRL are conducting a Golden Jubilee DXCC Award this year and already there are quite a number of amateurs who have gained the necessary number of 100 countries.

Reports indicate that KA2AJT, obtained it in 45 hours and 10 minutes of operating. His friend K2TQC, took a little longer, 46 hours even. Not bad operating gentlemen and of course readers have probably guessed by now that the mode was CW.

I have always maintained that the DX is there, if you are prepared to go after it. Again I stress that many amateurs just listen, but the way to go is get there and call CQ, on any band, not neglecting 15 and 10 metres, as, at times, they can yield the most unusual and exotic prefixes.

I admire the outgoing positive attitude of the amateurs that get amongst the action in contests, pile-ups for a rare DX station or just get on air to have a friendly chat with an amateur in another country, through HF or VHF.

How about it ladies and gentlemen, are we going to hear more CQs from this vast country of ours this year?

It would be a misnomer for me not to mention the fact that a lot of listeners can do quite a lot of good, in the hearing of distress calls and alerting the proper authorities. This happens quite frequently and personal feelings are that the events are not capitalised on, to put our hobby in a favourable light with the media and public at large, who are really unaware of the potential coverage that our hobby allows us.

ON THE MEND

It is hard to keep some DXers down. One of those is Iris W6QL, and the holder of a multitude of other calls from all parts of the world. A card from Iris, whilst in Sri Lanka indicates all is well and through good medical attention she is well on the mend and will soon be in Nairobi, then back home to the United States. The VK gang will be listening for you and Lloyd, Iris.

GRUMBLES AND HASSLES

By all accounts F8FNU has or rather had 70 different problems multiplied by an unknown figure. He is, but by now that may have changed to being 'was' the QSL Manager for 70 different stations and after numerous complaints about his QSLing he has resigned from the French Society, making him ineligible to despatch cards through the bureau. What the future holds for the amateurs that entrusted their logs to him for issuing their cards is unknown, but he is believed to be very silent both on and off air at present and he is not spending many Francs at the local post office.

If you have sent a card via the bureau to a station he manages, it is felt that you would have to be lucky to have received a reply. If there were enough VKs that had outstanding cards and they cared to note the details to me, I would correlate the list and forward it to the French Society. Though I feel sorry for the predicament and embarrassment that confronts them, it is felt that they have an obligation to find a solution to the problem of such a magnitude.

ST PETER AND ST PAUL ROCKS

This was a disaster, for the VKs that wanted it for a new one. They were active, but mainly in nets and with very sparse CW operation. It is believed that some VKs did make the valued contact on both modes. Congratulations, and for your luck, a ticket in the lottery would be appropriate.

YEMEN

Reports from overseas indicate that a station either signing 4W1AA or N5GJL/4W has been heard and worked. Gerry N5GJL, is in Yemen with

a transceiver, according to reports from his mother, as published in overseas newsletters. It is unknown whether he has a licence or authorisation that will stand up to the scrutiny of the Newington DXCC desk, but he is QSLing and giving the address of Gerry Jensen, Crew 770, PO Box 17086, Sala's, North Yemen. It is another one of those cases of work first and worry later. (It is one I would like in the log, better still with a confirmed QSL, and the knowledge it was legitimate — VK3AH).

SPRATLY ISLAND

Sense has at last prevailed. The proposed expedition has been postponed until January 1988, because of the political climate in the area. My personal belief for it to be removed from the DXCC list, until all hostilities in and around the area have ceased, still stands. It is wondered if the ARRL DXCC Committee has yet contemplated this action, before a serious mishap occurs.

ARRL DXCC

The committee has agreed not to allow country status for TP2CE and Tierra del Fuego. T50DX cards, according to Don Search, are not acceptable as a credit, as the documentation does not mention any call sign or amateur frequencies, also, St Peter 1 cards are acceptable after June 1 and none of the Ethiopia ET3 calls are valid since the early 1980s, when the hobby was suspended in that country.

The good news is that 5A0A cards are correct, and can be claimed for DXCC.

SAO TOME

Luís S92LB, is still around and he has migrated to two other bands, to make life more interesting for those that seek a CQO with him. He now works 40, 20 and 15 metres and has been worked in VK. So good hunting and lots of luck. Some overseas newsletters have graciously advised their readers that if he is being worked and there are VKs on the frequency, to please alert him. Thanks in anticipation for your assistance folks.

CHINA

It is now five years since the hobby recommenced in that country and the following stations were active as at the end of October last year. This is the last official update that I have but it is known that others are becoming active month by month.

CALL	QTH	DATE OF ESTABLISHMENT
BY1PK	Beijing	March 29, 1982
BY8AA	Chengdu Sichuan Province	November 4, 1982
BY4AA	Shanghai	October 12, 1983
BY1QH	Beijing	April 29, 1984
BY5RA	Fuzhou Fujian Province	January 4, 1985
BY5RF	Fuzhou Fujian Province	January 4, 1985
BY8AC	Chengdu Sichuan Province	February 28, 1985
BY0AA	Urumqi Xinjiang Uygur Zhiqig Province	April 5, 1985
BY1SK	Beijing	June 1, 1985
BY4QDM	Shanghai	September 28, 1985
BY4RN	Nanjing Jiangsu Province	December 25, 1985
BY4SZ	Suzhou Jiangsu Province	June 8, 1986
BY4RB	Zhenjiang Jiangsu Province	June 22, 1986
BY9GA	Lanzhou Kansu Province	August 5, 1986
BY7KT	Guangzhou Guangdong Province	July 20, 1986
BY5QA	Fuzhou Fujian Province	August 20, 1986
BY5HZ	Hangzhou Zhejiang Province	October 7, 1986

The two latest stations to come on air, BY5QA and BY5HZ, are using equipment that was donated to them by the Japanese Amateur Radio League. Another station due on line at any time now is BY4WNG, from the Nanjing Institute of Technology and whispers are that individuals manning their own stations will soon be active over the amateur spectrum, using various modes of communication.

BHUTAN

The Ministry of Communications failed to renew amateur licenses in 1982. There were very few to be heard at any time and it is understandable considering the stringent examination of 28 words of CW per minute and a very extensive practical examination. Pradhan A51PN, would have no trouble, because of his profession, in such an exam.

It appears that Bharathi VU2RBI, of Laccadive Islands fame and of course the recent Andaman and Nicobar Islands effort, will try to lead a group under the auspices of NIAF, Bharathi, is an excellent ambassador for our hobby and it is trusted that the group she leads to Bhutan, may bring enough enthusiasm from the locals and the government to get the hobby back on the air from that country. Good luck Bharathi, if your expedition to Thimpu comes to fruition. If it doesn't it will not be because of your lack of enthusiasm for the hobby and your skills of being an expert in public relations.

REVILLA GIGEDO

Quite a few utilities and grizzles over the last effort. Apparently the group had troubles but they still made over 15 000 contacts, which must bring it down on the wanted list.

YEVOAL AND YEVOIL

Joy VK2EBX, from Yeovil is an honorary member of the Yeovil Amateur Radio Club in Great Britain, who recently celebrated their 40th anniversary. The party was attended by the MP for Yeovil, Paddy Ashdown, and Mayor Joy Stanton. Both these personalities recorded a special message to the club's honorary member Joy VK2EBX, who is the only amateur enthusiast in the "sister" town of Yeovil, a town that was founded by Yeovil emigrants. Propagation and regulations combined, caused Joy to receive a cassette of the proceedings plus a copy of the article that appeared in a British newspaper, reporting the whole events and mentioning her name and association with the club. Also in the package was a beautiful Christmas card, signed by 30 members of the club. Congratulations Joy, this may be the start of becoming a media magnate. Who knows?



The unique commemorative QSL card, that unfortunately will never adorn a VKs collection, due to propagation on October 17, 1986.



The media photograph that was printed. Back row from left: G4JBH (hidden), G3MYM, G3NOF, G3OMH, Mayor Joy Stanton, the Hon Paddy Ashdown (MP for Yeovil), BR510663. Front: G3GC and G3BEC holding the anniversary cake.

Photograph courtesy of G4PDD

CAYMAN ISLANDS

Joe WA6VNR and his wife Lois WB6MME, will be active under the call of ZF2AH from June 26, until mid-July.

BUREAU REOPENED

The H44 Bureau is open for business again. Apparently there is quite a number of cards, (in the vicinity of 1000) still to be claimed by ex-H44A, ex-P29A and ex-ZL2A. It would be a safe bet to say that there would be a number of VK cards just waiting for the owner to pick them up.

The new address for the Bureau is: Solomon Islands Radio Society, PO Box 418, Honiara, Solomon Islands. Good luck folks!

ANOTHER AWARD

The heading is indicative of my personal enthusiasm, but 73 Magazine has seen fit in their wisdom to offer the "73 MAGAZINE'S DYNASTY AWARD." This award is based on just under 400 countries and virtually every fly-speck on a world map is covered. If it creates band activity, which I imagine it is designed to do, then it will have served its purpose. Only countries contacted after 0001 UTC, January 1, 1987, are eligible to be considered for the award.

For those interested, a copy of the rules and country criteria is obtainable from DX Dynasty Award, 73 Magazine, WGE Center, Peterborough, NH 03458 for a SAE plus postage (three IRCs or US\$1). A DX Map of the World is available for an extra US\$5 (plus extra postage). Who will be the first VK to achieve 350 'areas'? On CW? SS? RTTY? You do not have to submit QSLs for this award and there is no minimal signal report.

Regarding signal reports, I have always been under the impression that there was a minimum report for the ARRL DXCC. It appears that I may have been wrong as I have recently read that no report is necessary. I am amazed at some stations who give reports of 5x0, and some self appointed "policeman" listening on the side will chirp in that it is a good contact. If it is S0, how can it be R5. Think about it?

BURMA AGAIN

Reports have been received of a station signing XZ2A. As the hobby is completely banned in that country at the moment, the station is thought to be a pirate, so beware!



Jacke SP5DRH, who is well-known to VK DXers, uses a TS430S and wire antennas.

LIBYA

The good news is that Herbert SA0A, is now the proud owner of a FT901M, donated by the European DX Foundation. Now comes the question as to when is he going to place a signal down into the Pacific area, to check the propagation within the terms of his licence? Quite a number of VKs and ZLs will gladly accommodate Herbert with a report! Herbert requests that there are no duplicate QSOs for obvious and various reasons.

COCOS ISLAND

Bob VK9YW (W5KNE) and Jim VK9YS (VK9NS), seemed to have had their troubles, with various equipment and antennas after their arrival. I feel sorry for people that spend a lot of money, time and effort in organising an expedition and it turns sour on them. It is like the family that saves up their 'pennies' to have a holiday in the sun and rains every day, and that is talking from experience, unfortunately.

Bob, went home to the chores of editing the excellent DX newsletter QRX DX, and Jim went on to Christmas Island, for a weeks stint there.

CHILE

Your ears were not deceiving you if you heard and logged the unusual call sign 3G87PAX. The prefix and suffix was a special that would be loved by all prefix hunters. The special call was to commemorate the visit of Pope John Paul to Chile. All QSLs to PO Box 72, Valparaiso, Chile.

TOKELAU ISLANDS

Peter ZK3PM, is active again from this area. All QSLs to PO Box 7344, Wellington South, New Zealand.

DO NOT DESPAIR

Did you work G3JKI/5A on SS8 many years ago? If you did Ann Koloboff F6CYL, advises that she still has the logs and some unused cards and would like to see those that need it for a new country, get the card. QSL to Ann's QTH, with three IRCs for Air Mail return. Thanks again Ann from all DXers, for all your efforts that have come to fruition. Incidentally if you worked G3JKI/5A on the key, you have worked a pirate as no CW was used.

DO YOU CONCUR???

At last someone has stood up and put some valid recommendations regarding the ARRL DXCC. It is no other than Jay O'Brien W6GO, who has written to John W4FRU, Chairman of the DXAC. Jay's suggestions (that have been abbreviated) include the following:

- 1 The basic DXCC should go on a yearly basis and on a log extract following the concept of the Golden Jubilee Award. This should be the only way to obtain a basic ARRL DXCC certificate.
- 2 To compete for the Honour Roll and to be listed in the DXCC country standings, the applicant would send all their cards to the ARRL DXCC desk as is presently done. Perhaps the quantity of countries could be set at 150 or more before cards are sent to the League. The lowest country level to be reported in QST would be 150, or what level was set.
- 3 To maintain good standing in the endorsed DXCC list (the "top" level) and the Honour Roll, one must submit a minimum of five new countries per year or qualify for the current year's DXCC.

Jay believes that this approach would heighten the interest in DX, bring in more DXCC members, while at the same time preserve the prestigious Honour Roll and DXCC endorsements for those who have worked so hard to achieve the honour of being on the Roll. I, for one support your thoughts Jay and I feel that the committee under the leadership of John W4FRU, will explore all avenues and probably make the DXCC more interesting and rewarding for all amateurs throughout the world.

ITU DAY

Well it is that time again, ITU Day on the 17th of this month. It is predicted there will be many prefixes using the special suffix and one may pick up a new country or two.

I have had the honour of using the suffix and stations really came out of the woodwork to get a report and a card, so have a listen on all the bands and you are sure to pick up a few similar suffixes attached to various prefixes. Good luck!

BITS AND PIECES

Japan, now has a reciprocal licensing agreement with the United States of America, Canada, West Germany and of course Australia (see AR, page 42, March).

Korea amateurs are planning a special station for the commemorative call EK88AG, to be used during the Olympic Games in Seoul. ** C0X0Y, has been quite active from the South Shetlands. ** SP5EXA, has aborted his plans for Bouvet Island, due to economics, and will be QRV from Svalbard from June to August. ** JPYIEE, is a repeater located on the Ogasawara Islands, which has a input frequency of 29.580 MHz and the output frequency is 29.680 MHz. It is actuated by a 88.500 Hz tone burst. ** 9V1TL, is still looking for takers on 18MHz at around 1000 UTC daily. ** GE0GE VE3FXT, hoped to gain permission to operate from Marion Island, either with a Z88 call or VE3FXT/Z88, late last month but this has been delayed at least until nearly the end of the year with no reasons being given. ** NEBZ, had to be signing NEBZ/TI2 with TI2CC, for the CQ WW WPX Contest and staying on for a few days into this month. ** FV6FT, will be active from the International Fair in Toulouse until May 7. ** F5SIPA, was the call sign used by the International Police Association. Some of the operators were FDILWS, FD6IFR, FD5AS and F9RME. Probably a new prefix for those that seek them. ** The special prefix F6KFKV, will be aired from Tatiuh Island by the Versailles Radio Club on the 9th and 10th of this month. It is not a DXCC country or IOTA island. ** Marti OH2HB, oper-

It was a natural application of what was known.

USING A PRIMITIVE type of spark transmitter, young German physicist, Heinrich Hertz, caused a small spark to leap across a very small gap between two ends of a large resonant loop of wire placed near the transmitter.

This scientific breakthrough, which contributed greatly to the advance of knowledge, occurred exactly a century ago in May 1887, and could be described as the birth of wireless communication.

Hertz had, in fact, proved a theoretical prediction made some 22 years earlier by Scottish physicist, James Clerk Maxwell, who, at Cambridge University, was first to suggest that electrical waves could travel through space.

In theory, such waves would have the frequency and wavelength of water waves or sound waves, but would travel at the speed of light.

British physicist, Sir Oliver Lodge, reflecting on the Hertz breakthrough, later wrote a book called *Talks About Wireless*, in 1925 and said: "Hertz showed how to produce them practically, and what was more, how to detect them at a distance, in an elementary and purely laboratory fashion."

"Further improvement in detecting appliances were soon devised by many people, and in due time, they were amenable to practical and commercial uses by the energy and enterprise of Senatore Marconi and his co-workers."

"To a public ignorant of the work of Clerk Maxwell and Hertz, this application (Marconi's) came as a great surprise and seemed very novel and mysterious."

To physicists it did not seem so — it was a natural application of what was known."

Hertz, in a book *Propagation of Electric Action with Finite Velocity Through Space*, published in 1893, mentions similar experimental work carried out by others at the same time as his successful 1887 experiment.

He said there was scarcely any doubt that Lodge would have also succeeded in observing waves in air and proving the propagation with time of electric force.

Judging by the writings of Lodge and Hertz, there was nothing but a cordial and frank appreciation among physicists of the day.

Hertz, Professor of Physics in the University of Bonn, died on January 1, 1894, in his 37th year.

Another young man, Marconi, read mention of Hertz's experiments in his obituary, which set him on his course to make a practical use of Hertzian Waves.

Marconi, based on the work of Hertz and a number of other early radio experimenters, conducted short range practical tests in 1896.

In 1897, he sent and received messages over a distance of about seven miles, and by 1898 had established two-way wireless communications across the English Channel.

In 1901, Marconi, at St John's Newfoundland, received the Morse code letter S transmitted to him by Professor Fleming (later to invent the thermionic valve) from Poldhu, Cornwall, England.


As the 20th Century was dawning, the era of wireless experimenters had begun. Hundreds of radio amateurs in Europe, America and Australia, were inspired by news of Marconi's trans-Atlantic communication.

Rudimentary transmitters and receivers were constructed during the next decade.

The Wireless Institute of Australia was founded in 1910, and by the outbreak of World War I, the amateur radio movement was firmly established in many parts of the world.

Many years later, in an effort to pay a lasting tribute to Hertz, his name was adopted internationally as the unit for a cycle per second — thus we have Hertz, kilohertz, Megahertz, and Gigahertz.

Let us modern-day radio amateurs and short-wave listeners think for a moment of Heinrich Hertz, in this the centenary of his birth of wireless experiment.



Yours truly
H. Hertz

CENTENARY OF HERTZ'S BIRTH OF WIRELESS



Contests



lan Hunt VK5QX
FEDERAL CONTEST MANAGER
Box 1234, GPQ Adelaide, SA. 5001

CONTEST CALENDAR

MAY	
2	Utah QSO Party (Rules this issue)
2	County Hunters SSB Contest (Rules this issue)
9	Nevada QSO Party
16 - 17	Italian International Contest (Rules this issue)
23 - 24	UBA SWL CW Award
30	ARCI QRP CW Sprint
30 - 31	CQ WW WPX CW Contest
JUNE	
13 - 14	South America CW Contest
20 - 21	VK Novice Contest (Rules this issue)
20 - 21	SMIRK (6m) QSO Party
27 - 28	ARRL Field Day
JULY	
11 - 12	IARU World Championship
18 - 19	CQ WW WPX VHF Contest

The main contest of interest to Australian amateurs referred to this month is the **VK Novice Contest**, to be held on the third weekend of June. I would hope that conditions will be good for the Novice bands and that 80 metres will not be too noisy with QRN.

I would like to refer back to my notes in the May 1986 issue of *Amateur Radio* and quote as follows:

"I would certainly make a plea for Full Call operators to consider the advisability of reducing their output power in crowded band segments. Whether you are operating in the Novice segment or not should make no difference to the fact that you need only run as much power as is necessary to make your contact. At the same time, I would also appeal to those holders of a Novice call to realise that the Novice sub-bands are just that, they are **not** for **exclusive** Novice use. It would appear from my observations that quite a number do not understand this fact. The full call operator does have the use of all portions of the allocated amateur bands.

Finally, on this particular note, I might point out to all, that one only occupies the spectrum made available to us as a privilege and not a right. It is certainly incumbent upon all licence holders to treat this privilege with respect and carry out our operations in a manner which will not jeopardise our existence as amateur radio operators."

One much lauded old Australian tradition is to give the other fellow a fair go. I would expect that this should apply to our amateur radio activities, however, some of the things I read and hear these days just make me wonder where the old Aussie spirit has gone to. Perhaps, as people who "communicate" we should be the ones to set the example and thus try to lead the community, in general, back onto the right path. I know there will be quite a few readers who will agree with me on these points and there will also be many who can accept that something is sadly lacking in general attitudes these days.

Albeit, I do hope that you will enjoy the 1987 VK Novice Contest. I would also hope that there will be many more Novice Operators using some CW in this contest. It is a good chance to get on that mode and brush up your CW capability. Remember that the speed is restricted according to the rules and also that the other operator will be only too happy to slow down to your speed as he wants a contact from your station. You might also note that the rules are again unchanged for the third successive year.

There is not too much more for this month, so I will simply wish you all the very best for now.

—73 de lan VK5QX.

VK NOVICE CONTEST 1987 — RULES

Contest Period — From 0800 UTC, June 20, 1987 to 0759 UTC, June 21, 1987.

Objects of the Contest — To encourage contest operation of amateur radio stations in Australia, New Zealand and Papua New Guinea, with special emphasis on contacts with Novice and radio club stations.

Stations Eligible — Only stations in VK, ZL and PZ call areas may enter. No stations outside these areas are permitted to be worked or entered in a log for the purposes of this contest. Except for radio clubs, no multi-operator working is allowed. Stations in the same call area may contact each other as well as contacting stations in other call areas.

Contest Bands — All operation must be confined to within the Novice frequency sub-band allocations in the 10, 15 and 80 metre bands. No crossband operation is permitted.

Modes of Operation — Only Phone or CW may be used. In the CW mode, operation must not exceed a speed of **ten words per minute**. This is to encourage the use of CW by all operators and to allow improvement of this mode by those operators who do not usually practice same.

Contest Sections — a) Phone — Novice/Full Call. b) Novice/Full Call. c) Listeners.

Scoring — Transmitting Entrants for contacts with a Novice Station — five points for contacts with a Club Station — 10 points

for contacts with a Full Call station — five points
Listener Entrants for Novice/Novice Contact — five points
for Novice/Full Call Contacts — two points
for Full Call/Full Call Contacts — two points

Any contact with a Club Station — 10 points.

Call Procedure — For phone operation call **CQ Novice Contest** and for CW operation call **CQ N**.

Contacts — Any station may be contacted only once per mode per band.

Number Exchange — On phone, stations must exchange a serial number comprising an RST report followed by three figures. The figures must commence with 001 and increase sequentially by 'one' for each contact up to 999. If 999 is reached the serial number is to revert back to 001 and the sequence recommenced. For CW, stations must exchange a serial number comprising an RST report followed by three figures on the same basis as described above for a phone contact serial number. Radio club stations must **add the letter 'C'** following the serial number.

Log Entries — Each log sheet should be laid out such as to provide columns in the order given as follows:

Date/UTC Time, Band, Mode, Station Contacted, Serial Number Sent, Serial Number Received, Claimed Score.

Total Claimed Score should be shown at the bottom of the Claimed Score column for each page. Each log sheet must also be endorsed at the top **VK Novice Contest 1987**.

Front Sheet — A front sheet must be attached to each log entered and must carry the following information:

Name of Operator, Address, Call Sign, Section Entered, Claimed Score.

Declaration — The Front Sheet must also carry a declaration which states that —

I hereby certify that I have operated within the rules and spirit of the contest.

Each entry must carry the signature of the licensed operator of the station and be dated accordingly. In the case of a club station the entry must be signed by a responsible officer of the club committee or a licensed operator delegated by the committee to do so. In the case of multi-operator stations, the call signs of participating operators must also be shown on the front sheet.

Regulations — All stations participating in the contest must be operated within the terms of the station licence and applicable regulations.

Submission of Entries — Logs are to be forwarded to the Federal Contest Manager, c/o Box 1234, GPQ, Adelaide, SA. 5001. Envelopes are to be endorsed **Novice Contest** on the front outside. Entries must be posted so as to reach the box number no later than July 28, 1987. Any entries received later than this date may be used as check logs only.

Certificates — Certificates will be awarded to the top scoring entrants in each section at the discretion of the Federal Contest Manager and to any other entrant where meritorious operation has been carried out in the opinion of the Contest Manager.

Trophy — The Keith Howard VK2AKX Trophy will be awarded to the Novice entrant with the highest aggregate score from both the Phone and CW Sections of the contest. This trophy is a perpetual trophy and will be held by the winner until such time as it is awarded to a winner of a subsequent Novice Contest. Should two or more aggregate scores be equal, a decision will be based on a count back as to the greater number of Novice stations listed in each log entry. Should such a count also be equal, the log containing the greatest number of CW contacts will be preferred. In the event of a further tie, under these rules the log will be placed before a committee which will exercise a vote as to the nearest and most meritorious entry.

Disqualification — The Contest Disqualification Criteria, as published in each August issue of *Amateur Radio* shall apply. Any station observed during the contest as constantly departing from the generally accepted code of operating ethics, may also be disqualified.

UTAH QSO PARTY

From 0000 to 2400 UTC, Saturday, May 2, 1987.

This is a joint effort sponsored by the Utah ARC and the UTAH DX Association to make this rather rare state available for WAS and other awards.

Exchange — RST and QTH. County for Utah; State, VE Province, or DX Country for others. (Novice and Technician stations must identify by signing "N" or "T" after their call).

Scoring — Utah stations score five points for Novice or Technician contacts, three points for all other QSOs. Out-of-state stations score five points for Utah Novice or Technician contacts, three points for all other Utah QSOs.

Multipliers — States plus VE Provinces plus DX Countries worked for Utah stations. Utah counties per band, or out-of-state stations (maximum of 29 per band).

Frequencies — CW: 1.810 MHz and 60 kHz up from bottom of each band. SSB: 1.860, 3.980, 7.280, 14.280, 21.380 and 28.680 MHz. Novice: 3.710, 7.110, 21.120, 28.110 MHz.

Awards — Certificates to the winners in each State, VE Province, DX Country, Novice in each State, and the top three winners and Novices in Utah.

Mailing deadline is June 1, to — Curt Wilbur K7WCU, 907 East 250 South, Bountiful, Utah, USA. 84010. (Include a SAE, plus postage for a copy of the results).

COUNTY HUNTERS SSB CONTEST

From 0001 UTC, Saturday to 2400 UTC, Sunday, May 2-3, 1987. (Off: 0800 to 1200 each day).

This is the 16th annual contest sponsored by the Mobile Amateur Awards Club to increase activity for the County Awards program. The two four-hour rest periods are mandatory.

Emphasis is on mobile operation. Fixed stations may work other fixed stations, but only once regardless of the band. Mobiles may be worked from each county or band change. Mobile contacted on a county line count as one QSO, but two multipliers. QSOs made on a net frequency do not count.

Exchange — Signal report, County, and State; Country for DX stations. (Mixed mode contacts are permitted providing one station is on SSB).

Points — Contacts with a fixed W/K, one point (including KH6KLT); W/K contacts with VEs, three points; W/K contacts with DX, five points; contacts with US Mobsiles, 15 points.

Final Score — Total QSO points times total number of US counties worked.

Frequencies — 3.870-3.890, 7.225-7.250; 14.250-14.285; 21.360-21.380; 28.570-28.600 MHz. The following frequencies are considered "Mobile Windows"

3.875, 7.240, 14.270 MHz (± 5 kHz). Fixed stations must work after working a mobile station.

Awards — Plaques to the first and second placed US mobile, top scoring fixed US/Canadian, DX station, and Mobile Team. Certificates to the top 10 mobiles, and the top scorers in each State, Province and DX station.

It is suggested that you send a large SASE for detailed rules and log forms to WA5DTK. All entries must be received by June 3, and should be sent to Barry Brewer WA5DTK, 1013 North Boulevard, Universal City, Texas, USA 78148. Winners will be announced in the MARAC Newsletter. (Include a large SASE and postage for copy).

THIRD ITALIAN INTERNATIONAL CONTEST

From 1600 UTC, Saturday, May 16, 1987 to 1600 UTC, Sunday May 17, 1987.

Amateurs world-wide must contact Italian stations including San Marino Republic, Vatican City and SMOM.

Classes — Single operator CW; single operator SSB; single operator mixed mode; multi-operator; SWL only single operator mixed mode. Multi-operator stations can use both CW and SSB.

Bands — 28; 21; 14; 7; 3.5; 1.8 MHz. Italian stations are allowed to use 1.830-1.850 MHz on 160 metres and 3.613-3.627 and 3.647-3.667 MHz on 80 metres. Bands can be changed only after 10 minutes operation on each band.

EXCHANGE — RS/T plus QSO number beginning at 001. Italian stations must send RS/T plus two letters (Province) eg 599MI, 59VE.

QSO Points — European stations: two points every QSO with an Italian station. Extra-European stations: four points for every QSO with an Italian station. The same station can be contacted on the same band once on CW and once on SSB.

Multipliers — One multiplier for every Province per band. San Marino Republic, Vatican City and SMOM are additional multipliers.

Final Score — The sum of QSO points from all bands multiplied by the sum of the multipliers from all bands.

SWLs — Take credit for only Italians heard. The same station can appear no more than three times on every band as a correspondent. The same station can be heard only once on CW and once on SSB.

Logs — Must contain date; time in UTC; band; mode; call sign; report sent; report received (including Province); QSO points and new multipliers. Include a summary sheet with your call sign, class of participation, number of QSO and multipliers on each band, final score and usual declaration. Please remember your full address, description of your equipment and your comments. Logs must be posted within 40 days from the end of the contest to: ARI Italian International Contest, c/o ARI, via Scarlati 31, 20124 Milano, Italy. Participants are kindly invited to use the official summary sheet.

PENALTY — Logs without a summary sheet and a declared score will be considered as check-logs. A declared score of five-percent more than the actual score will mean disqualification. If the 10 minute rule is not followed, logs will not be accepted.

AWARD — Special awards will be issued to the top five of every class of participation. A certificate will be awarded to the top scoring operators in each category.

WAIP — The Worked All Italian Provinces Award is issued to all amateurs for contacts with 60 different Provinces. This will be issued upon a written application in the log, and a separate list of the QSOs valid for the award. Only for the contest QSO, QSL cards are not required, but the award

must be requested at the same time that the contest logs are sent. The cost of the WAIP Award is 10 IRCs.

—Contributed by Giorgio Beretta IVXV

1987 COLUMBUS CONTEST

The Genoa section of Italian Amateurs Radio Association (ARI), supported by ARI, in co-operation with the International Institute of Communications (IIC), announces the 1987 Columbus Contest (Sixth Edition).

The purpose of this annual competition is to remember the great Genoese discoverer of the New World, Cristoforo Colombo.

During the whole contest, from 0000 UTC, October 3, 1987 to 2400 UTC, October 4, 1987, a special station, with a special IOTIIC call sign will be active in Genoa.

RULES:

Call — SSB: "Columbus Contest"; CW, RTTY, SSTV: "CC".

Bands — All amateur bands are allowed, 80 metres excluded because of the heavy band restrictions for the Italian radio amateurs.

Type of Competition

—Single operator, single band in CW, SSB, RTTY, SSTV or Mixed.

—Single operator, all bands in CW, SSB, RTTY, SSTV or Mixed.

—Multi-operator, single band in CW, SSB, RTTY, SSTV or Mixed.

—Multi-operator, all bands in CW, SSB, RTTY, SSTV or Mixed.

Also, QRP for each type of class (power must not exceed five watts output).

In all classes, single transmitter operation only is allowed.

Valid Contacts — Among European and no-European stations; Italian stations may only contact other countries.

Number Exchange — RS/T plus ITU Zone number (Italians give RS/T plus Province).

Multipliers — For non-European stations; Italian provinces and each call area of all other European countries of the ARRL DXCC List.

Points — Three points for intercontinental contacts on 14, 21 and 28 MHz; six points for 1.8 and 7 MHz.

Scoring — The final score is the result of the total QSO points, multiplied by the sum of multipliers. **Pauses** — Single operators must not operate for more than 30 hours; the 18 pause-hours must be divided in no more than five periods; each period cannot be less than 30 minutes.

Summary Sheet — Must indicate call sign, name, address, participation class, final and each band score, a signed declaration of respect of all contest rules.

Log Instructions

—All time must be indicated in UTC.

—No more than 40 QSOs for each sheet.

—Use a separate sheet for each band.

—Duplicate contacts must be indicated and not counted.

—Each pause period must be indicated with the beginning and ending time.

Disqualification — Normal Contest Disqualification Criteria applies.

Trophies and Plaques — Will be awarded to the first classified of each participation class.

Columbus Contest Award — Will be issued for all amateurs that have a minimum total of 100 QSO plus one contact with IOTIIC.

Special Prizes — Will be given for distinguished behaviour and amateur spirit. Logs to be forwarded to ARI, PO Box 347, 16100 Genova, Italy.

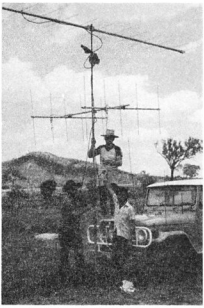
—Contributed by Franco Bertoldi

JOHN MOYLE MEMORIAL FIELD DAY CONTEST

How many can claim a two-way phone contact on 10.320 GHz for the Field Day?

Through the expertise of Frank VK4CAU, Peter VK4FPE and Brian VK4QCB, a contest was made at 0425 UTC on March 14, 1987 and later, by VK4WIR/P and VK4QCB/P at 0455 UTC, a 5/9; 4/4 contact was made over a distance of 16.5 kilometres.

Frank was using an AUSSAT Dish with 8 mW power output, whilst Brian used a Dick Smith Dish



Frank VK4CAU, adjusts the Horizontal/Vertical Two-metre Antennas assisted by Phil VK4TPK (left) and Ted VK4JTW.

(refer AR, November 1983 — article by Des VK5ZO on 10 GHz).

VK4WIR/SOLAR PORTABLE, at an elevation of 80 metres above sea level, was operating as a multiple operator/multiple mode field station at Bond Road, Alton Downs, the property of Phil VK4TPK.

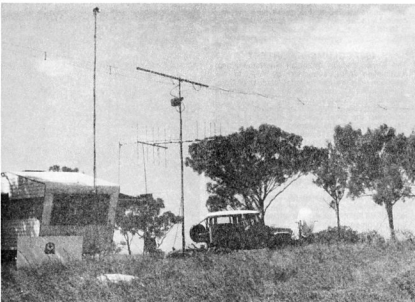
The station was operated from the Rockhampton/Fitzroy SES Caravan and was powered by eight solar panels producing 20 amps continuous to five banks of 12 volts batteries.



Frank VK4CAU.



The Power Supply — Solar — Battery — RF



The Antenna Farm.



VK4WIR/P via VK4CAU contacts Brian VK4QB/P on 3 cm. Nick VK4NFL, "keeps the log."



Brian VK4QB, makes some minor adjustments to the 3 cm dish.



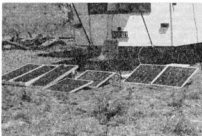
Ted VK4QI (left) and Alister (son of Rob VK4TKA) at the Operating Console.



Frank VK4CAU, with the 3 cm transmitter.



Rob VK4TKA.



Solar Cells.

Setting-up the station began at 7 am on the Saturday morning, and the first contact was made at 0101 UTC with VK4FWA in Ayr.

The station was operated by Ted VK4QI (CW), Lyle VK4ALD (phone), Rob VK4TKA and his son Alister (phone), and Frank VK4CAU (3 cm phone).

Alister, under the guidance of Rob, had a busy time early on Sunday, with 11 144.100 MHz Simplex contacts in excess of 300 km.

An exhaustive list of equipment ranging the band was thus — three FT7s, IC271, FT680, IC490, IC290, FT2FB, FT77, and, just in case the solar failed and mains power had to be used, a FT102 and two TS520s.

The antenna farm consisted of a trapped dipole for 80 and 40, inverted Vee 40/20 dipole 20, multiband HF, 3 cm, 70 cm, 2m, 6m, and 28m.

Amateurs Phil VK4TPK, Ted VK4JTW, Bob VK4ZDB, Noel VK4ZAR, Glen VK4AEE and Karllyn VK4MPY, made up the team who ran coaxial cables, climbed the trees, and, with a little improvisation, put up the aerials.

Frank VK4CAU, also operated a TRS80 computer as a field log to prevent duplication of contacts. Frank's unit ran off the SES 3.5 kW generator, which also provided comforts such as refrigeration and lighting for the barbeque on Saturday night.

Just before closing down the station, the Local Controller for the Rockhampton/Fitzroy SES, Mr Rhyse Fraser, visited the site and was greatly interested in the activity and the professional way in which the station had been operated.

—Contributed by Nick Guigley VK4NFL



Frank VK4CAU, with the AUSAT Dish for 3 cm.

1986 — VK/ZL/OCEANIA CONTEST RESULTS

Jack White ZL2GX

NZART Contest and Awards Manager

152 Lytton Road, Gisborne, NZ.

CW SECTION

ASIA				JL3WSL				1296	JA3UWB				448	UC2AA				510	UCT1WWF*				570								
JA1BNW				4692	JA1BSU				928	JR3CVJ				432	JJ3GPC				286	RBSMF				1638	RBSVB				320		
JA1JGP				864	JF1AIX				572	JR3CAH				70						UBSTN				144	UBSLCV				126		
JP1TRJ				480	JF1QZJ				482	JE4VVM				9374	JA4GXS				920	RBSIF				84	UB4MZL*				1520		
JE1AER				336	JH1MTR				240	JF4LNO				18	JA4GXS				920	UB5DAV				CHECK							
JA1AAT				112	JS1GHA				96	JR5HCY				4368						U060C				144	UD6DKW				2		
JK1CCD				84	JATYWX*				10028	JA6GGD				13886	JAEFT				952	UL7BY				1836	RL8PYL*				2132		
JE2YRD				10260	JA2DN				2352	JA6GDU				120	JG6UHE				72	UM8MZ				40							
JA2KPD				460	JH2XTV				72	JA6BWH				8						UJ8JA				1364							
JE2EQ				30																											
JR3BOT				7548	JA3ARM				418	JA7GLB				34450	JA7YFB				30344	UBIAJ				646							
JK3DEJ				308	JA3UWB				256	JH7WQJ				22784	JA7AOR				14194												
JA3YBF*				7644						JA7OOT				3512	JE7SLC				162												
JE4VVM				7644	JR4ISK				2	JH0NZN				3420	JH0SPE				1820												
JA6JU				1836	JA6GGO				462	VU2UR				96											RASYG				448		
JA2BTB				448	JH6YTD				234	HL1APR				374	HL1ABR				176						UA9FAR				286		
JA6BWH				176																					U93WSE				160		
JH7WQJ				8640	JA7KM				690	NORTH AMERICA														U295SWW				CHECK			
JH7AJD				476						VESCDX				8154	KBSVL				15416						UA0LCZ				5208		
JA0AJ				9964	JH0NZN				1476	W02V				13392											UA0DO				1920		
JA0UMV				1068																					UA0WDF				198		
VU2UR				72	HL1XP				2064	SOUTH AMERICA														U0C0M				21			
NORTH AMERICA									PT2TF				96	LU4LAV				276						UA0FDX				21			
W02V				9180						YV5BPG				64											UA0BCK				CHECK		
K6NA				80	AA6EE				50	OCEANIA														U20LWA*				4234			
OCEANIA									KAYT/DU1				50424											9512				3078			
K1BAZ /DV1				2552						JA2EZD/WH0				25560	K1BAZ/DV1				7784	USSR RESULTS — SSB											
YB2FEA				7866	YC4FSM				2800	YB5NOF				13860	YB5QZ				1412	UA4RZ				4224	UA4LNU				2050		
YB2A				1500	YC4GAP				1232	YB2DX				1500	YB2CEC				84	UA3SE0				1008	UA4HNP				660		
YB7KD				280	YB7HB				CHECK	YB2BLR				300	YB2EC				60	UA4WE				200	U23A3H				198		
YB4FN				320											YB2EC				60	UV3TK				CHECK	UB3JWA*				6300		
EUROPE									EA2CDX				2	HA4XX				60	U24WVW*				616	U24YXX*				308			
CT1YH				70						HB98OU				3312	HB9K				252	UA2F0				240	U230XW*				CHECK		
DK3KD				272	EA3CLO				24	OH5U				380	OH5YF				342	UC2A				144	UC2AAD						
EASCPD				70						OH7AA				300	OH3SD				18	UC21WWF*				240							
EASCIW1				2						OH6JC				2	OH7NW				2	UP28FD				12	UP1RWX*				242		
GSMY				270						OK2BBI				456	OK3YCZ				320	UP1BWC*				6888	UP1BWW*				CHECK		
HASLZ				864	HB9A0D				2548	PA3DJC				520	PA3CEF				2	UQ1GWW*				12740	UP1BYL*				780		
LB7BK				72						SM6001				68	SM6KMD				8	U05OV				72							
LA7MFA				8						SM5BBS				CHECK						RBSMF				1760	RB5QZ				8		
OE1TKW				198						SP22FJ				50	SP6DVP				2	RBSNT				CHECK	UB4MZL*				876		
OZ5KU				1700	OH6YF				2	Y21UC/a				1254	Y39TF				330	UJ8JCQ				540							
OH3TY				1700						Y54NL				330	Y24CJ				144	UM8DX				660	RM8MA				644		
OH7NW				198						Y5ZWG				70	Y39SH				18	U0BCD				160	RL82AA				25		
PA0LNU				2						Y44PF				30	Y36SG				18	UL8PYL*				10584	UL8LWA*				832		
SM7ANB				296	SM6001				110	Y23CO				CHECK	Y24NG				CHECK	UA0LCZ				1920	U0C0M				90		
LZ1KVZ				728	LZ1NS				40	Y55TJ				CHECK	Y51XE				CHECK	UA0FDX				CHECK	U20QNA*				22288		
LZ1KNP				24	LZ250				18	Y54TA				CHECK	Y41NK				CHECK	U20JWA*				10160							
YU2EE				70	YU7SF				6	Y03CDO				18						RW9UR				2240	U290WD*				960		
UB4XWB				1156						YU7SF				2	UB4XWB				1296	U29CYP*				128	U290XW*				CHECK		
Y22UB				338	Y27QD				308	ASIA SWL														USSR RESULTS — SWL							
Y52TE				270	Y36TG				128	JA1 7777				608	JA8 3769				504	UA4 095 595				1350	UA3 137 988				140		
Y21TL/a				72	Y54ZA				48											UA4 156 871				58							
Y58ZA				32	Y36SG				2											UP2 038 1580				9740	UP2 038 1580				2964		
Y28LG				CHECK	Y23U/a				CHECK											UB5 073 3135				13032	UB5 073 4075				CHECK		
Y22HF				CHECK	Y21UC/a				CHECK											UD6 001 220				50							
SWL																			UL7 026 586				352								
SP 0149 K1				60	OH1 100				60																						
OK1 30 464				190	OK3 13095				92																						
Y2 8867 G39				206																											
Y02ZUH				374																											

PLAQUES

These have been awarded to top scoring single operators as follows:

CONTINENT	SSB	CW
Asia	JA1YWX	UADSAU
Europe	H89DU	U4ARZ
North America	H89SVL	W02Z
South America	L4L4V	
Oceania	K4YT0U1	YB2FEA

Many thanks for your support in this Jubilee Contest. Congratulations to all participants and especially to the top scorers.

After over 40 years administering this contest, I will soon retire so this will be my last result!

NOTES

1. To celebrate the 60th Anniversary of NZART, special certificates were printed for the 1986 "VK/ZL/C" and plaques were prepared for continental winners on phone and on CW... BUT...
2. Seldom have conditions been so consistently bad and this is obvious from the small number of logs received. NZART expresses gratitude to those who submitted logs — especially those with only a few contacts.
3. Plaques have been despatched (regrettably none to Africa and phone only to South America), while certificates have been awarded as generously as possible and Participation Certificates sent to those who requested them.

4. Receipt of Logs... even at this date — FOUR months after the contest weekend, logs are still being received. If any miss the deadline of February 15, it is regretted but four months should be sufficient time for transit of logs.
5. These results bring to a conclusion my 40-years-plus period of responsibility for administering this contest for NZART. It is difficult to express my appreciation to so many with whom friendships have been developed, but I am most grateful to you all and trust that your enjoyment in this activity will grow with the years. Good cheer and 73, Jack.

VANUATU TROPICAL CYCLONE AMU DISASTER

Jim Linton VK3PC

4 Ansett Crescent, Forest Hill, Vic. 3131

The devastation of cyclone Amu, which struck Australia's South Pacific neighbour, Vanuatu, was relayed by Tex YJ8OK, to listeners on 14 MHz in Australia, New Zealand and Alaska. He described the first accounts of the damage of Amu, which struck with full force on February 8.

Sam Voron VK2BVS, heard Tex while checking 20 metres for any contact with YJ8 while after hearing news reports of the cyclone.

The graphic details of the widespread damage given by Tex, in the Vanuatu capital of Vila, were much sought after by the Australian news media. The eyewitness account featured in the media throughout Australia, including the front pages of at least the *Canberra Times* and *The Australian* newspapers.

Tex and his wife, Julia YJ8NJW, sheltered in a cupboard in the only part of their home which had not been unroofed.

Limited to battery power, Tex checked into the Australian Traffic Net (ATN), every two to five hours to bring news updates to the outside world.

The latest damage estimate to Vanuatu had been put at \$4200 million in Vila alone, and little was known about the outlying areas of the nation which were also hit.

Sam Voron recalls that, after hearing news reports of the cyclone, he decided to listen for a call from YJ8, and was rewarded with a contact from Gaeton YJ8LT. Gaeton's native tongue was French, so he passed the microphone to an English-speaking non-amateur to assist.

"Two hundred kilometre winds last night, everything wiped out," made it clear a major disaster had occurred, said Sam.

The ATN was immediately set-up on 14.307 MHz to handle any emergency traffic — a long list of radio amateurs were involved — too numerous to mention specifically.

Sam said it was Sunday, and with Government departments closed, traffic had to be restricted to actual life and death situations. The ATN was on alert while attempts were made to gain third party traffic approval between Australia and Vanuatu.

On Monday, Dave VK2BBT, rang DOC to request such an agreement so health and welfare messages to and from the disaster area could be handled. All day, the Vanuatu radio amateurs were unsuccessful in finding an official to tie up their end for an agreement.

The Australian Department of Foreign Affairs advised DOC the next day that, under the circumstances, it authorised an immediate third party temporary agreement.

Vanuatu had, in fact, responded last year in principle to Australia's request for a permanent agreement — but the necessary paperwork had not been exchanged.

Sam advised the third party traffic nets in Israel, Canada and the US, that Australia was now in a position to link into Vanuatu any traffic they had for the disaster area. To provide access into the amateur service, a number of radio amateurs offered to have their telephone number broadcast over the local media. Commercial radio and

television stations, the ABC and Special Broadcasting Service carried the numbers in their news bulletins.

There were numerous stories and interviews about how radio amateurs in both Australia and Vanuatu were helping out in time of crisis.

Radio Vanuatu, the local broadcaster initially put off air by the cyclone, also had regular bulletins on how the public could send their messages to Australia, and beyond, via amateur radio.

Because local telephone communications were severed, people were advised to go to the general store in the centre of Port Vila where radio amateurs were posting up messages they had received. The store owner, Robert Laellie YJ8VRL, helped the public fill out amateur radiogram messages for transmission to Australia.

Sam Voron comments, "You can imagine the pride of amateurs in Vanuatu at this time where they were able to help concerned people crowding round, looking for a message or wanting to send one."

The technical resource of the Amateur Radio Service was in demand in other areas. John YJ8JG was trying to get the nation's computerised banking system operative again, and Jack YH8JH, President of the Vanuatu Amateur Radio Society, was busy at Air Traffic Control.

All available members of the Society helped in the disaster recovery and welfare relief effort in the days following Amu.

Through the ATN, there were some 60 messages passed during a 10 day activation. One of the messages was from Jim VK2BFWMM, on the Australian geoscience research vessel *United Venturer*, which carried a helicopter and was ideally fitted for survey and relief work.

Jim's offer of help in the disaster recovery was taken personally by Tex YJ8OK, to the Vanuatu President, whose response via the ATN was "Please come urgently, and immediately."

The *United Venturer* left Fiji, arriving eight days after the cyclone hit, and was the first foreign vessel to reach Port Vila.

On the Wednesday evening after the cyclone, Andrew H44AF, on the Solomon Island capital of Honiara, checked into the ATN to say he was prepared to assist the Solomon Island Red Cross in their desire to communicate with Vanuatu. He was informed the ATN would be happy to assist, but first there should be a third party agreement between the Solomon Islands and Australia. Next day, a Solomon Island official rang DOC, in Canberra, to give verbal authority, and at 0130 UTC, Thursday, February 12, a temporary H44-VK agreement was placed.

Sam Voron comments it was expected that permanent agreements with Australia, between both Vanuatu and the Solomons would be signed, and the importance of such agreements in international emergency preparedness was clear.

He said: "It means that, as with all other countries which already have third party agree-

ments, a regular traffic net will be maintained with a known emergency plan."

"This will bring Australia and our partners to the immediate aid of each other in future Pacific disasters without the red tape delays."

"Assistance will be more effective because of the on-going communications preparedness which permanent traffic agreements foster."

NEW ZEALAND EARTHQUAKE — NO

THIRD PARTY TRAFFIC

Radio amateurs in Australia and New Zealand were reported in newspapers, on radio and television news services on both sides of the Tasman Sea, as being upset at the New Zealand postal authority's refusal to let them send messages in the wake of New Zealand's earthquake which hit on March 2.

The New Zealand Government rejected offers to set up a third party net to handle health and welfare traffic, despite normal telephone services in the earthquake area, near Whakatane, south of Auckland, being out.

One report said all telephone lines within a 150 km radius of New Zealand's worst earthquake for 40 years had been cut.

THE WIRELESS INSTITUTE OF AUSTRALIA (ACT)

&

THE IONOSPHERIC PREDICTION SERVICE PRESENT

A Short Course on the Ionosphere for Amateur Radio Operators.

Date:	Monday, May 25, 1987.
Time:	7.00 pm to 11.00 pm.
Venus:	The Griffin Centre, Bunda Street, Civic.

Literature and explanatory notes will be distributed by the lecturer. This will be of benefit to all amateurs, and will explain the nature of the ionosphere, how propagation occurs and how to correctly interpret propagation predictions.

All interested persons are most welcome, not just members of the Wireless Institute of Australia. As space is limited, please RSVP to:

Alan Hawes, President, on (062) 58 8115 or (062) 58 2568 AH, by May 18, 1987.

Please note that, due to the length of the course, the start time is 7.00 pm, an hour earlier than the usual start-time for WIA meetings, and it will run for approximately four hours.

—Contributed by Alan Hawes VK1WX, President WIA (ACT Division) Inc

KEEPING AMATEURS IN TOUCH!

The Magnificent... Yaesu FRG-9600

All receivers should be built this way — but then, Yaesu know how to build the best! The FRG-9600 is THE all mode VHF/UHF Receiver for the serious minded amateur. Covers the complete 60-905MHz spectrum with manual or fully automatic scanning — the choice is yours! FM, AM, CW, SSB... it's all there. For more features and better value, you can't go past DSE and Yaesu! Cat D-2825



\$1199

General Coverage FRG-8800

With an 8 bit microprocessor controlling all the tuning, mode selection, scanning, memory and clock functions you know the FRG-8800 can give you all the versatility you're ever likely to want. Covers the entire 150kHz-29.999MHz range PLUS it has inbuilt provision for VHF converter. Features 12 internal memories, keypad, dial or automatic tuning, all mode/selectable IF-BW... just about everything a general coverage receiver can have! Cat D-2820
FRG-8800 DC kit Cat D-2822 FREE with purchase of D-2820 — value \$8.75



\$1259

The Complete Amateur Station

For the amateur who wants everything in a transceiver — Yaesu developed the FT767GX. You want all bands? With 767 — you've got it! From 160 metres to 70 centimetres. Want that again? Yes. 1.8 to 440MHz in one transceiver. You don't know what features are till you've seen the 767 and once you've seen it — you'll own it! Cat D-2935



At selected branches only **\$4995**



The Best Test

The Oskerblick SWR-145 keeps you up to date! Designed to be left 'in-situ' for permanent readings. With a top range on two metres of 250 watts and, for VHF users, it needs very low power for full scale readings! Cat Q-1341

\$99

Hand-held Power

Meter. Weltz quality, the ultimate versatility and DSE value! Check the output of your hand-held accurately — just connect the TP-05X in place of your antenna and you've got it! 50-500MHz Cat Q-1343

FREE with any VHF hand-held set

\$29

Simple hands-free operation

Give your FT-2700RH or your FT-2701RH virtual hands-free convenience with the SB-10PTT Switch Unit. Use with optional headset/boom mic etc. Cat D-3519

\$39.95

"We all know that the world's best selling Electronics Kits are from Heathkit..." Jack O'Donnell — M.D. Altronics. Thanks Jack: you're right of course.



Heathkit

The Weather Detector!

The Digital Weather Computer displays everything from wind chill factor to indoor/outdoor temperatures, to wind speed and direction with accurate 16-point compass resolution. It even has microprocessor controlled memory for data storage by date and time! But what's best is... You can build it yourself! Cat Q-2000

\$995

The best in the land — DSE KITS

UHF 40 Channel \$249 Transceiver

With the DSE Explorer 70cm needn't be out of your reach! For a fraction of the cost of commercial models you too can be out there on the air waves. It's not a beginners kit — but then it's not a beginners sport! Cat K-6300

UHF 80 Channel \$1295 Upgrade

Add another 40 channels in the band from 439-440MHz to your DSE Explorer. This simple circuit gives the Explorer extended coverage of the UHF FM Amateur Band. Simple and incredibly inexpensive! Cat K-6301

50 watt UHF \$279 Power Amp

This amazing kit will lift a 2 watt output rig to the 50 watt level! Use it with CW, FM and SSB modes. Features 10MHz bandwidth, harmonics better than -60dB, 12 volt operation for mobile or home use AND DSE value! Cat K-6307

VHF Amateur \$199 Transceiver

Save a fortune and get yourself a quality VHF transceiver into the bargain! The DSE Commander covers the full 144-148MHz band in 10kHz channels with 5kHz offset and has full repeater facilities built-in. Comes with everything you need to get it up and running. Cat K-6308

UHF Gasfet Preamp \$89

Give your 70cm a real boost in the reception department! For the 430-480MHz bandwidth you couldn't ask for a better kick in the butt. Ideal for both UHF CB and UHF amateur use! Easy to build and even easier to install. Cat K-6309

2m Linear Amp \$249

For the serious VHF DX'er here's a superb all mode high powered linear amplifier which will give you that access to the distant repeater! Suitable for both mobile and base operation. Designed for reliability! Cat K-6313

- Frequency coverage: 144-148MHz
- Maximum output: 120W (CW) for 15W input

VHF Wattmeter \$5295

This could save you a fortune! Get the most from your equipment. The VHF Wattmeter measures the VHF power output and the efficiency of your antenna system by measuring the reflected power from your antenna. Cat K-6316

- Usable Frequency Range: 144-148MHz
- Maximum Power: 150 watts
- Ranges: 0-150 watts, 0-30 watts

**DICK SMITH
ELECTRONICS**

PTY LTD

Who gives the best price on
Amateur gear? — DSE of course!



Awards

Ken Hall VK5AKH
FEDERAL AWARDS MANAGER
St George's Rectory, Alberton, SA. 5014

DIPLOMA REPUBLICA DE CHILE (Republic of Chile Award)

The Radio Club de Chile (CE3AA) was founded in 1922. It sponsors the following award for radio amateurs.

RULES
The award shall be forwarded to any licensed radio amateur who makes contact with 16 different CE radio amateur stations from any Chilean zone, to form the phrase "República de Chile" with the last suffix letter of the call sign.

All contacts will be valid from January 1, 1986, on any band or mode.

Contestants must send the corresponding QSL cards or, preferably, a list of QSOs, duly certified by a IARU member society, including the following data:

Date, Station, Band, RS/T, Mode.
Cost of the award is eight IRCs.
Applications to Awards Manager, Radio Club de Chile, PO Box 13630, Santiago, Chile.

All QSL cards (when received) shall be returned simultaneously with the award. Remittance of the award shall be by air mail.

Radio Club de Chile declines all responsibility in case of missing QSLs.

Call signs must be sorted in order to read the requested phrase.

ARNHEM CERTIFICATE

This award is presented to confirm that a radio amateur has worked/heard the required number of members of the VERON, section Arnhem.

The certificate can be obtained in four classes, as there are:

CLASS A — HF five stations.
CLASS B — VHF/UHF/SHF amateurs 15 stations.
CLASS C — For Dutch D-licensed amateurs 10 stations.
CLASS D — SWL, all classes possible.

There are no mode or band restrictions, but 432 MHz QSOs count for double points and 1296 or higher count triple. Only contacts on or after January 1, 1980 count for the certificate.

Send full details, signed by two licensed amateurs and 10 IRCs or H15 to the Awards Manager, PO Box 4119, 6803, EC-Arnhem, Holland.

CRIMSON CRUSTACEAN AWARD (See also AR, August 1985, page 45)

The Gladstone Amateur Radio Club's award is called The *Crimson Crustacean Certificate*, and measures 21 by 25 cm. It depicts bright red printing and a red crustacean on a yellow background. The Gladstone area is well-known for its mud crabs and fishing industry, which is only one part of the many industries in the Central Queensland harbour city.

The award is open to all amateurs and SWLs and the Club welcomes call-ins on its weekly net every Tuesday night, commencing at 0900 UTC on 3.570 MHz (± QRM). The Club call sign is VK4BPA.

Conditions for the GARC Award are as follows:

1. All contacts after March 11, 1985 count towards the award.
2. All contacts must be on the same band and in the same mode.
3. To qualify, a transmitting amateur or short-wave listener must show evidence of contact with

a) the club station, VK4BPA, and eight different Gladstone Amateur Radio Club member base station OR
b) the club station, VK4BPA, five different Gladstone Amateur Radio Club member base stations and one Gladstone Amateur Radio Club member station, portable or mobile.

4. Evidence in the case of clause 3 will be a certified copy of the log, stating call signs, times, dates, modes and frequencies.
5. The cost of the Certificate is \$2.50.
6. The address for the award is: The Awards

Manager, Gladstone Amateur Radio Club, PO Box 1030, Gladstone, Qld. 4680.

AUSTRALIAN DXCC AWARD (as at December 31, 1986)

Number of current countries: 317
Number of deleted countries: 52, shown in brackets after the current countries score.
Overseas members are included in brackets.

CW SECTION

311 (43) Frank Hine VK2QL
307 (33) Austine Henry VK3YL
304 (48) Dave Duff VK2EO
299 (31) Ivor Stafford VK3XB
293 (24) Fred Lubach VK4RF
292 (34) Reg Ross VK3YD
290 (15) Mike Bazley VK6HD
279 (34) Col Wright VK7LZ
278 (25) D Kiewewetter VK2APK
277 (21) Mavis Stafford VK3KS
271 (42) Jim Rumble VK6RU

PHONE SECTION

315 (49) Jim Rumble VK6RU
311 (47) Stuart Milowick VK5MS
310 (43) Tom Mulder VK6MK
307 (34) Bram Jellott VK5AB
306 (31) Keith Schleicher VK4KS
305 (17) Robin Lyon VK6LK
304 (10) Gill Moody VK4AK
303 (14) Ken Chiverton VK4VC
302 (13) Fred Lubach VK4RF
301 (33) Geoff Wilson VK3AMK
300 (11) Mike Bazley VK6HD
299 (16) Col Wright VK7LZ
298 (16) John Heine VK3JF
297 (25) Austin Condon VK5WO
296 (14) Laurie Werner VK5XN
295 (10) Bill Verrall VK5WV
294 (10) Neil Penfold VK6NE
293 (35) Ken Jewell VK3AKK
292 (36) Bill Hempel VK4LC
291 (34) Peter James VK3AWY
290 (43) Syd Upperton VK6HE
289 (22) Bill Wells VK1WB
288 (4) Steve Gregory VK3OT
287 (4) Jim Joyce VK3YJ
286 (18) Arthur Johnson VK4PX
285 (5) Frank Beech VK7BC
284 (5) Ray Miller VK3RF
283 (31) Gillian Weaver VK6BYL
282 (19) Chas Taylor VK4UC
281 (23) D Kiewewetter VK2APK
280 (4) Stephen Chamberlain VK6IR
279 (2) I G Haworth VK6IH
278 (5) Andrew Everts VK7AE
277 (21) John Woodings VK6AJW
276 (18) Ron Glasscock VK4BG
275 (27) Noel Hanson VK2AAH
274 (5) Peter Cosway VK3DU
273 (4) John Nakulski VK3BLN
272 (16) Rowland Bruce VK5OU
271 (2) Cardie McQuillan VK3ACD
270 (2) Sam Galea VK2AKP

OPEN SECTION

315 (49) Jim Rumble VK6RU
311 (43) Tom Mulder VK6MK
307 (34) Keith Schleicher VK4KS
306 (31) Austine Henry VK3YL
305 (17) Gill Moody VK4AK
304 (10) A Sharland VK4SD
303 (14) Mike Bazley VK6HD
302 (13) Fred Lubach VK4RF
301 (33) John Heine VK3JF
300 (11) (Mary Ann Crier VK3AHUP)
299 (16) Col Wright VK7LZ
298 (16) Geoff Wilson VK3AMK
297 (25) Austin Condon VK5WO
296 (14) Bill Verrall VK5WV
295 (10) Ken Jewell VK3AKK
294 (5) Ivor Stafford VK3XB
293 (4) Frank Beech VK7BC

301 (32) Bill Wells VK1WB
300 (44) Arthur Johnson VK4PX
299 (33) Steve Gregory VK3OT
298 (32) D Kiewewetter VK2APK
297 (18) (Ruthanna Pearson WB3CON)
296 (22) Chas Taylor VK4UC
295 (16) Syd Molen VK2SG
294 (14) Ron Glasscock VK4BG
293 (43) J Anderson VK3JA
292 (30) Noel Hanson VK2AAH
291 (44) John Nakulski VK3BLN
290 (36) George Luxon VK5RX
289 (10) David Portley VK4DP
288 (16) Cardie McQuillan VK3ACD
287 (2) Sam Galea VK2AKP

WIA 75 AWARDS RECIPIENTS UPDATE

700 Iemal BS, YC7BS
701 Sofyan Zainuddin YC7FT
702 Club Station YC7ZAC
703 Abdullah H Ali YC7BO
704 Drs Arif Asikin YC7FA
705 Charles Bersch KJ3R



QSP

ART COLLINS WOCCX (SK)

Arthur (Art) Collins WOCCX, founder of the Collins Radio Company, died on February 25, aged 77. First licensed as a radio amateur in the 1920s, Art formed the Collins Radio Company in 1931 to build quality transmitters principally for radio amateurs. When Admiral Byrd planned his 1933 expedition to the Antarctic, he selected Collins to build his transmitters.

There were two key inventions by Collins which helped make the company's transmitters superior to any other commercial manufacturer: the Autotune, a device which enabled the transmitter to be tuned instantly, and the permeability tuned oscillator (PTO).

In the 1930s, Collins began building transmitters for Braniff Air Lines, becoming the leading supplier of avionics equipment. By the 1970s, it was estimated that Collins' equipment was used for communications or navigation by 80 percent of the free world's airlines.

Prior to WWII, the Collins Company won major US Navy contracts, which launched the company into large-scale electronic production. During WWII, there was Collins communications equipment in most Navy ships. Collins transmitters aboard the USS Missouri were used to broadcast the V-J Day surrender ceremonies.

To radio amateurs, the Collins Radio Company is best associated with its early work with single sideband. In 1955, its KWS-1 was virtually the first commercially manufactured SSB transmitter. For decades Collins equipment was the "top of the line" amateur equipment and it was a dream-come-true for many amateurs when they could eventually own it.

During his life, Art was given a number of awards and honours including the Navy Distinguished Public Service Award, the highest award the Navy can grant to a civilian, the Armstrong Medal from the Radio Club of America, the David Sarnoff Award from the Armed Forces Communications and Electronics Association, the Outstanding Achievement Award from the American Electronics Association, and three honorary Doctorates of Engineering.

After leaving the Collins Radio Company in 1971, he formed a research and development firm in Dallas, where he continued his contributions to the electronics industry.

—From The ARRL Letter, March 10, 1987

Electro-Magnetic Compatibility Report

Hans Ruckert VK2AOU

EMC REPORTER

25 Berrille Road, Beverly Hills, NSW 2209

EQUAL DUTIES, EQUAL RIGHTS

In a democratic country one would expect that all citizens have equal duties and equal rights, even if some duties are not popular with some people. Radio amateurs have the duty not to radiate more RF energy on frequencies outside the amateur band allocations, than technical standards permit, so that suppression is possible at reasonable cost. A critical case is the third harmonic of the 21 MHz amateur band which falls in television channel 2. The West German law on amateur radio states that the harmonic radiation — in the case of TVA — must not exceed 1.25×10^{-12} watt, approximately 31 dB (pW). $1 \text{ pW} = 10^{-12}$ watt. This means that a 400 watt transmitter must suppress the third harmonic of 21 MHz (for example by about 114 dB. Popular transceivers already provide between 52 and 80 dB third harmonic suppression at the 100 watt output level of the 21 MHz signal.

TESTS BY DL1BU, CQ/DL

IC-703: -66 dB; F-7: better than -70 dB; IC-701: -52 dB; FT-901: -80 dB; TS-520S: -56 dB; TS-820: -65 dB.

It depends on the level of drive what happens to the third harmonic level in the final amplifier and the output tuned circuit. It becomes obvious that we have to use an effective low-pass filter directly connected to an RF, tight PA stage, which can attenuate the 63 MHz harmonic further by about 60 dB. This can be done, as tests on low-pass filters have shown:

Attenuation of some filters at 60 MHz —
LF30A (Kenwood, good to GHz) 57 dB
SP-30/500 (Haro, Germany) 73 dB
SPX-30LF (Haro, Germany) 76 dB
Auth (Germany) 57 dB

VK2AOU (several filters) 60 dB.

Here ends the responsibility of the radio amateur and what may be reasonably be expected of him (West German Law on amateur radio G-1239A, 2.6.1980, page 958).

If one owns a motor car, one is responsible that the car is compatible with its environment on the road. The manufacturer conducts some quality control tests during manufacture. He offers the dealer service free of charge with the same aim. Later the car has to pass some registration tests for which the owner has to pay.

Why should it be different with electrical/electronic appliances? Manufacturers and owners should be responsible for the compatibility of these appliances with other services using allocated RF spectrum sections (licensed transmissions). The law states in some countries, that radio listeners (long wave, medium wave, short wave, VHF and UHF) and television viewer have the same right. That means that the radio amateur has the same right as the television viewer as far as RFI is concerned. This means also that the television manufacturer and the television viewer are responsible (or should be) for the compatibility of the television operation with other services. Therefore the television set should not act as an unlicensed transmitter, causing severe RFI to shortwave reception every 15.625 kHz over a 4 kHz wide band and up to 57 dB (pW) (or 59 dB) are experienced from television sets operating in the neighbourhood. The West German law on radio communication specifies that unwanted radiation from television sets must not exceed 44 dB (μV) at 75 ohms = 25 dB (pW) = 3.16×10^{-10} watt, which is a signal of about 150 μV at 10 m, measured at 3 m distance using the substitution method and a 30 dB antenna.

Design steps have to be undertaken to prevent this signal from reaching the television antenna. The signal from the high voltage line frequency oscillator, as radiated by the television chassis, peters out usually at 2-3 m distance if the set was

correctly designed — but this is unfortunately not always the case, as for example reported by K4SYP in QST December 1986 (see later). This case shows that duties and rights of the radio amateur are not treated fairly by the law makers. Quite a few VK amateurs seem to have the same problem, including this writer, whilst my own television set causes no line oscillator RFI. If we know the house where the RFI comes from, we should demonstrate the interference to our neighbour, who will not be aware of the trouble his television set is causing. We should write a letter to the manufacturer (see RFI-TVA assist list published earlier in AR). Have the letter also signed by the neighbour and ask that the television set be fixed free of charge, if possible. State that other makes and models of television set do not cause the RFI, which in many cases makes shortwave listening impossible. Is your own television set compatible with your shortwave amateur radio band reception? Some dealers have been known to say that our amateur band receivers are too sensitive, so that the RFI is the fault of the transceiver manufacturer. What would they say if a suggestion that television and radio manufacturers could learn from amateur radio transceiver manufacturers how to improve the dynamic range and intercept point of these appliances to avoid much of the RFI. We can only hope that standards and law makers apply equal standards as far as duties and rights are concerned. (Another possibility is that a practicing third harmonic free 21 MHz signal may overload the television frontend, so that the television set generates the 63 MHz itself due to too low dynamic range).

"Living with TVI" (should be called TVA) by K4SYP, is definitely not the answer to electro-magnetic compatibility. If your neighbour is a senior citizen (as in my case), who is watching television from the early morning hours to late at night, this method would be the end of amateur radio for me, and others too.

The method is of little use if the television set is correctly designed, since harmonics from the line frequency are not then heard at more than 3 m distance from the set and are not radiated by the television antenna. Good will, by the radio amateur is not enough, to solve the EMC problem at the root.

LIVING WITH TVI

"I live in a small apartment building at a summer resort area. During the colder half of the year, I am the only occupant and have no TVI worries. As warm weather approaches, however, the other apartments start filling up. Three tenants have hand-me-down TV sets with poor antennas that are particularly susceptible to TVI. (My own set is free of TVI even when I use my amplifier. Thus my station emissions are clean. That doesn't cut any ice with the neighbours, however, who want to see their programs.) For my part, it is good practice to keep my neighbours happy. So, do I go QRT during all TV-viewing hours? Not on your life! I have set up a TV detector to determine when the neighbours are watching TV.

"If you live in an apartment building, perhaps you have noticed that your AM broadcast receiver is little better than useless when your (or your neighbours') TV is on. This is the result of interference from the TV horizontal-sweep oscillator, and it is especially prevalent near the low end of the AM-broadcast dial. Such interference is much worse on longwave frequencies (160-1000 kHz). All I do is tune my receiver near 150 kHz (the 10th harmonic of the sweep frequency) and a loud roaring noise can be heard when a neighbouring television set is on.

"My discovery does not cure TVI, but it does allow me to operate many hours when I would otherwise have to stay off the air."

—Robert J Pankins K4SYP/EA5CH, Murcia, Spain, from QST December 1986



QSP

HOME VIDEO PROGRAM DISTRIBUTORS

Executive has noted, with concern, the growing number of television program and VCR distribution devices being offered for sale to the public, most of which re-transmit on UHF and VHF television channels. In one instance, it has been reported that the device uses the 50 cm amateur band and in another, a control allows the user to make significant adjustment of the output channel frequency.

We have written to DOC advising the WIA attitude, namely that it is strongly opposed to use of such devices in the domestic environment which may exacerbate an already difficult interference situation. In particular, the use of a device which could increase unnecessarily the susceptibility of home entertainment units to amateur transmissions is to be deprecated.

We have also urged that action be taken to ban sale of such equipment and DOC is "proceeding urgently" with the issue of an appropriately stringent performance specification for distribution equipments which will enable action to be taken under the Radiocommunications Act against the sale of "sub-standard devices". In addition, DOC has undertaken to issue, as soon as possible, a warning to the public that such units as described are not approved and that interference problems are likely with those that are already in use.

The Executive is monitoring the situation and would appreciate advice via Divisions on any problems encountered by amateurs stemming from the use of home video program distributors.

—Prepared by Allan Flockroft.

COMPUTER TAX

TRIALS ARE BEING carried out on a system which will allow tax returns to be filed by computer.

Taxpayers will be able to prepare their returns on a home computer and lodge them by phone under the system planned by the Australian Tax Office.

First to have dial-up access will be most of Australia's 26 000 tax agents who already handle 60 percent of all tax returns.

FAX BUSINESS

FACSIMILE is overtaking telex as the most popular form of written telecommunications in Australia.

It is now estimated that about 50 000 Fax machines have been installed which exceeds the number of telex machines.

Australia ranks fourth behind Japan, the US and Britain as a major facsimile market with machines from 14 companies being sold.



WICEN News

Paul Walton VK3PW

5 Elgin Grove, Belgrave Heights, Vic. 3160

EXERCISE SOUTHERN LINK

COUNTER DISASTER EXERCISE

On the weekend, October 25-26, the Health Department of Victoria held a Counter Disaster Exercise, at the Portsea School of Army Health. The aim of the exercise was to practice communications skills, on-hand experience in use of equipment, rapid processing of information and decision making. Groups represented were hospital medical co-ordinators, ambulance co-ordinators, Telecom, Metropolitan Fire Brigade, Police, SES and WICEN.

The weekend began at 9 am on the Saturday, when everyone checked in at the base and found their allotted accommodation. A welcoming address by the Army Base Liaison Officer, Major Tony Haller, led to the briefing for the first exercise by Dr John Wattenhall (Exercise Director).

The scenario was "a scorcher of a summer has led to outbreaks of fires ranging from Cape Schank, on the Peninsula, through to the Toolang forests, near Healesville."

The exercise practiced message handling in tiered layer format from the on-site ambulance crews and their controllers, Central Medical Co-ordinators and Emergency Operations Centre, located at the Frankston Hospital and the Ambulance Service Headquarters throughout the disaster areas. The co-ordinators at each level were given a set of circumstances as a guide to the creation of messages and dissemination throughout the system. All messages were to be passed by radio or magento phones. (At one stage the phone network failed and had to be backed-up by WICEN).

To increase tension in decision making, the outbreaks of fires occurred at different times, as they would in actual circumstances, thus making it difficult for ambulance co-ordinators to predict where their services would be required. To add to their plight, the exercise was run in triple time where two hours real-time encompassed six hours of exercise time — the messages thereby came at an alarming rate.

Debriefing found that some of the medical personnel were unfamiliar with the phone and radio equipment provided, as well as not being too proficient with the most efficient means of communicating their given information. It was hoped the following days exercise would rectify these problems.

The remainder of the day consisted of presentations by Alan Bramfit, of Telecom, and Dennis Furlong, of WICEN. They demonstrated the type and uses of equipment available for various communications requirements.



Dennis VK3XP, Region 28 Co-ordinator of WICEN, looking over the Ambulance Movement Control Bus.

With exercise business concluded for the day, visits were organised to view the remains of the old artillery battery stands which were used during wartime to protect the Port Phillip Heads entrance. A guided tour was conducted through the quarantine station, which has been set up to depict how the station was used when it screened Australia from disease being carried in from overseas. Dinner for the evening was held in the Officer's Mess, followed by socialising at the Officer's Bar, a pleasant way to end the day's events.

Sunday morning warmed-up with talks from the Metropolitan Fire Brigade and demonstrations of their latest technology radios and on-site intercompatch units. This was followed with Brian Frankish, from the State Emergency Service, who spoke on voice procedures to be used in effective communications.

Exercise II followed in which "a dense fog had caused a major traffic accident at the entrance to the Mornington Peninsula Freeway. The accident had occurred during morning peak-hour and involved a school bus, a tanker carrying toxic chemicals and numerous passenger vehicles."



Leigh VK3CDR WICEN State Co-ordinator, assisting at the station of Paul VK3PW.

The tier structure for the co-ordinators remained similar to the previous days exercise. Logistics were required by the medical co-ordinators to ascertain the injuries sustained at the site and the possibility for further injuries from released toxic gas. Arrangements had to be made between the hospitals and the ambulance staff to ensure that they departed to hospitals which had the required facilities; ie intensive care beds.

Due to the nature and size of the accident, the MFB became involved along with the Department of Defence through the Premier, Mr Cain. This led to the co-ordinators having many avenues of assistance available provided they knew who to use and the most effective way of communicating through to them.

Debriefing of this exercise proved that procedures had run smoother and faster than the previous day, and that the "hands-on" experience had been beneficial to those who participated.

Dr John Wattenhall, concluded the weekends events by thanking everyone for attending and making the exercise the success it had been. He expressed that those who had participated had gained valuable experience in the handling of large scale disasters, along with the opportunity to see how the "other half" of their team would work. It had given people the opportunity to meet their counterparts from regional and metropolitan centres, thereby strengthening their ties should they become involved in a jointly fought disaster. John finished by hoping further exercises of this nature would be conducted to further these gains.

Intruder Watch



Bill Martin VK2COP

FEDERAL INTRUDER WATCH CO-ORDINATOR
33 Somerville Road, Hornsby Heights, NSW 2077

Opening the column this month, I offer a welcome to the new Intruder Watch Co-ordinator for the VK3 area. He is Philip Pavay VK3BHN, of 6 Bayview Road, Toraroin, Vic. 3980, who replaces Bill Wilson VK3DXE, who has had to vacate the post. Welcome to the IW, Philip, and let us hope that the VK3 boys and girls give you some support. (And girls, that applies to all States, not just Victoria — let's hear more of you.)

Speaking of support: those who helped out in January were: VK2DEJ, Mr G H A Bradford VK2-SWL, VK3XG, VK3Z, BG, BHJ, BTW, DA, KH, OD, VK5E, SJF, GZ, TL, VK6FO, VK7RI, VK8H and JF. Thank you one and all. January is traditionally a slow month for the IW, with people being away from the shack on holidays, etc, but all the same, 158 broadcast intruders were reported; 143 CW intruders; RTTY intrusions numbered 97, other modes totalled 65, and 33 intruders sent their call signs.

Some enlightening news from Joeke PA0VDV, the IARU Region 1 Monitoring System Co-ordinator. Joeke picked up a call sign on the Australian IW Report, which he assures us is not an intruder at all. I speak of VK3A, a call sign which was unfamiliar to me. This call sign belongs to a USSR Amateur Radio Club Station, and he sends amateur news and sometimes Morse practice tests. So if you hear this call sign, he is legitimate.

Information from Ulrich DJ9KR, the DARC IW Co-ordinator, tells me that "the Italian telecommunications authorities have reaffirmed their wish to monitor the radio spectrum, especially that of the radio intruders. It is their will to enforce the fight against intruders." — good stuff.

Some interesting (disturbing?) news from the UK. In Radio Communication, January 1987, the following:

"The Management Consultancy CSP International has been conducting research into the allocation of the radio spectrum. It is understood that the CSP report proposes that the Government relinquish detailed control of most of the radio spectrum not used by the military to Independent Spectrum Management Licenses (SMLs). Each SML would control a block of radio frequencies and "sell" them to users."

... the report goes on to say that "it appears that amateur radio will not be subject to these arrangements." Mmmmm...

So there is something to think about as you chase the elusive DX... see you next month, and take care.

Acknowledgments: VK4BHJ and Radio Communications.

POTS AND PANS ANTENNAS

THE SKYLINE IN DHAKA, the densely populated Bangladesh capital, was festooned with aluminium dishes, cooking pots and pans covers — all fitted to television antennas.

A new fad had developed to add metal to antennas when seeking to get better television reception from neighbouring India.

Home-made antennas were first the work of youths wanting to watch cricket test matches between India and Pakistan, on India's state-run channel. But the fad has now spread to other groups, most of whom want to watch Indian feature films.

AMATEUR RADIO PLAYS A PART

EASTERN ZONE REPEATER PLAYS A ROLE IN RESCUE

Eastern Zone WIA Victorian Divisional Repeater plays a role in the rescue of an injured four-wheel drive owner.

The Latrobe Valley two-metre repeater, VK3RLV, was used on Monday, March 9, to notify the Ambulance Service of an injured motorist on the Dingo Hill Track, north of Tambooritha, in Gippsland.

Whilst attempting to drive up a steep section of the track, the 4WD slipped backwards and crashed into a tree. The vehicle was badly damaged and the driver suffered severe bruising to the back of the neck.

The vehicle was so badly damaged that the doors of the vehicle had to be forced open and the other people in the group were worried about the possibility of spinal damage to the driver.

The people in the party had 27 MHz Citizen Band radios, but were unable to contact anyone outside the remote area to raise the alarm. Their CB call was received by another 4WD party in the vicinity. This party include a radio amateur, VK3XGQ. The two-metre repeater, VK3RLV, is one of the network of repeaters operated by the Victorian Division of the Wireless Institute of Australia, through their zones. The Victorian Division pays the licence fees, insures and helps run and co-ordinate all primary repeaters in Victoria. In so-doing, it ensures that the majority of Victoria, including the remote areas, have repeater coverage in times of disaster.

VK3RLV was used to liaise and direct assistance during the incident at Dingo Hill Track.

The Helicopter Ambulance used during this rescue is operated by the South Eastern Region, Victorian Helicopter Ambulance Service, which is part of a co-ordinated state-wide system.



National Safety Council Helicopter en route to the Dingo Hill Track.

The helicopter, pilot and crewman are provided by the National Safety Council of Australia. The Ambulance Officer on board usually comes from the district involved.

It is interesting to note that on Monday, three simultaneous helicopter ambulance rescues were performed by the South Eastern Region Service. These were:

At sea off Mallacoota (see below).
Dingo Hill Area.
Carrington (south of Traralgon).

That is, three helicopters and crews were provided by the service.

Col Pomroy VK3BLE
PO Box 218, Churchill, Vic. 3842



One of the Helicopters engaged in another facet of their work — dousing bushfires.

COOKIE CUTTER RESCUE

Amateur radio operators participate rescuing the yacht Cookie Cutter.

Harold Tribe VK3AVH
20 Morotai Street, Sorrento, Vic. 3943

At approximately 7.50 am on March 9, 1987, a Mayday call broke into the Net where Alan VK3ASB, Hal VK3AVH, Alan VK3BNZ and Fred VK3BYW, were engaged in their usual contact.

Alan VK3ASB, immediately returned the call and received a weak reply. At the same time, Hal VK3AVH, telephoned the OTC Coastal Station, in Melbourne, requesting they monitor the QSO between a distressed vessel and VK3ASB.

The message eventually received was as follows:

Call Sign — VE0MCO
Location — 150 degrees East, 38 degrees South
Vessel has rolled 360 degrees losing mast
Two persons aboard
One person seriously injured

The signal was very weak, as no doubt the radio equipment, including the batteries had suffered in the roll-over. The marine radio, which is always used first, was evidently inoperative.

The Federal Sea Safety Surveillance Centre, Canberra, received the relevant information by teletypewriter at 8.01 am, from Melbourne OTC radio, and proceeded with the rescue procedure.

There was a lapse of about 11 minutes only from the time the Mayday call was received by the amateurs to the time rescue procedures commenced in Canberra.

At the request of Canberra, the amateurs tried to maintain contact with the vessel, but unfortunately could not make contact.

Shortly after 8.00 am, Len VK3NPG, received a Mayday call from the yacht, *Cookie Cutter*, with the same information as the other group, but on 3.583 MHz. This message, which now included the name of the yacht, was phoned to Canberra at 8.15 am, thus reducing any thoughts of a hoax call.

Subsequently, Des VK3BSB, was called in because of his near location to the vessel, so he could monitor the frequency and relay the progress of the rescue procedure being obtained by Len VK3NPG, via telephone from the Canberra Centre. This information included a message to *Cookie Cutter* to turn on his EPIRB (radio beacon) to help with location. (Len knew the vessel's receiver was operational, even if the transmitter was not).



Air-Sea Rescue.

It is believed a Fixed-Wing Aircraft (F27) was airborne by 8.45 am attempting to locate the yacht.

Sometime later, a helicopter, with a paramedic and the necessary equipment to rescue the skipper, was above the vessel. The paramedic, from the National Safety Council, was lowered onto the vessel and assisted the occupants to clear the deck of the damaged rigging and they then made their way to the lee-side of Gabo Island. Lyle Chase, the skipper, was then flown to hospital on the mainland by helicopter.

Sydney Amateur Digital Communications Group AX25-X3 Protocol for use in Amateur Packet Radio

Steven Blanche VK2KFJ

Secretary, SADC

PO Box 231, French's Forest, NSW. 2086

Part 2: TNC PARAMETER DESCRIPTIONS

Here is a short description of each TNC parameter. This section should be read with reference to the parameter summary which follows in Part 3.

1 Command Escape Character

Set this parameter to the decimal number equivalent of the ASCII character which you wish to use to cause the TNC to enter command mode. A value of 0 will disable entry into command mode.

2 Echo

If echo is enabled, characters sent to the TNC will be sent back (echoed) to the terminal where they will then be displayed. If every character you type is displayed twice, your terminal is probably set to "half duplex" with TNC echo enabled. If you do not see anything as you type, your terminal is probably set to "full duplex" with the TNC echo disabled.

3 Data Forwarding

This parameter determines which characters from the terminal will cause a packet of data to be transmitted.

4 Idle Timer Delay

Each time you send a character to the TNC, the idle timer is restarted. If there is no more input to the TNC and there is still data in the TNC buffer to be sent when the idle time expires, the data will be transmitted automatically.

5 Flow Control to the TNC

This parameter controls the flow of data to the TNC. It allows the TNC to stop incoming data from the terminal when the TNC's internal buffers are full. This parameter is very important when sending computer files on the packet network.

6 Control of TNC Messages and Prompts

This parameter controls the sending of messages (including responses to commands) and prompts (including the command mode prompt).

7 Operation on Break

This parameter determines the TNC's response to a "break" signal from the terminal. A "break" is detected if the transmit data line from the terminal to the TNC is held in the "space" or logic 0 condition for more than one character (the time including the stop bit).

8 Discard Output

Setting parameter eight to one will stop correctly received packets from being sent to the terminal.

9 Carriage Return Padding

This parameter controls the delay between a carriage return character sent to the terminal and the first character of the next line. The delay is achieved by sending the specified number of ASCII NUL characters (character 0). This will be most useful to systems using mechanical terminals (or printers) or electronic terminals which lose the first few characters of each line.

10 Line Input

The TNC will start a new line after the specified number of characters have been sent to the terminal. This is useful if your terminal discards data which would extend past the end of the line. This parameter does not affect keyboard input.

11 Binary Speed

Parameter 11 indicates the speed (bits per second) of the terminal. The value is set by the AUTOBAUD routines in the MASTER ROM and cannot be changed by the user.

12 Flow Control to the Terminal

This parameter allows the user to control the flow of data from the TNC to the terminal. If parameter 12 = 1, you may use the XOFF character (DC3 or control S) to stop data from the terminal and later use the XON character

(DC1 or control Q) to resume.

13 Linefeed Insertion

This parameter controls when line-feed characters are inserted by the TNC. Be careful when transmitting computer files as setting this parameter to 2, 6 or 7 will insert line-feeds into the transmitted data which will cause the received file to differ from the original.

14 Linefeed Padding

This is similar to Carriage Return padding except that the time delay is produced after a line-feed character is sent to the terminal.

15 Editing

This parameter enables or disables editing while not in command mode. The editing characters are defined in parameters 16, 17 and 18. Parameter 16 (character delete) is always available in command mode.

16 Character Delete

Typing the character defined by this parameter will delete the last character in the buffer. If you try to delete past the start of the buffer, the terminal's bell will sound (if it has one). If parameter 19 = 1, a "!" will be displayed. If parameter 19 = 2, the sequence <backspace> <space> <backspace> will be sent to the terminal.

17 Line Delete

Typing the character defined by this parameter will delete all characters in the buffer. If parameter 19 is not 0, the TNC will send "XXX" and start a new line.

18 Line Display

If parameter 19 is not 0, typing the character defined by this parameter will cause the TNC to start a new line and display the current contents of the buffer. This is particularly useful when parameter 19 = 1.

19 Editing Service Signals

This parameter controls the displayed response to parameters 16, 17 and 18. If parameter 19 = 0, there will be no displayed response to the editing characters (the editing will still occur if editing is allowed by parameter 15).

20 Echo Mask

If echo is enabled (see parameter 2), this parameter allows you to stop the echoing of certain characters.

21 Parity Treatment

This parameter is not fully implemented. If your terminal is using parity, it will be detected during Autobaud. The TNC will then expect and generate the same parity conventions as the terminal. Any character received by the TNC with incorrect parity will be discarded.

22 Page Wait

Output to the terminal will be paused after the specified number of lines. Send an XON (control C) character to the TNC to resume output.

23 Buffer Cushion

When the TNC attempts to stop the flow of data from the terminal to the TNC, the terminal may still send one or more characters before stopping (some terminals will send the rest of the line). The buffer cushion is designed to absorb these extra characters, enough data must be successfully transmitted to empty the buffer cushion before any more terminal input will be accepted.

24 Linked Timeouts

If the TNC makes a transmission which is not acknowledged while linked to another station, a time-out will occur and the TNC will try again (a re-try). If the number of time-outs (re-tries) specified by parameter 24 occurs without any acknowledgments from the other end of the link, the TNC will return to monitor mode.

25 Unlinked Timeouts

This parameter is similar to parameter 24 except it controls time-outs while not linked. This affects connect and disconnect requests.

26 Line Timeout

This parameter sets the time-out period for parameters 24 and 25.

27 Duplex Line Control

When parameter 27 = 0, the normal half duplex mode is assumed — the TNC will not transmit if the channel is busy. If parameter 27 = 1, the TNC will ignore the carrier detect signal from the modem. This mode is used for operation on noisy HF or satellite circuits where a reliable carrier detect signal is not available.

28 Clear to Send Delay

This parameter controls the delay between RTS (request to send) to the modem and the beginning of the packet. It is useful for modems without a built in delay between RTS and CTS or for transceivers with very slow changeover from receive to transmit.

29 Link Control

If parameter 29 = 1, other stations will not be able to link to your TNC. Any station attempting to link to your TNC will display a "(CALLSIGN) busy" (resource unavailable) message. This feature was provided so that stations providing Remote Bulletin Board Services can temporarily take the system "off air" for system maintenance but still provide an indication that the system is functional.

30 Unused Link Control Parameter

Information Frame Call Sign Display

This parameter controls the display of call signs in the address field of information frames while your TNC is in the unlinked state.

32 Received Packet Forwarding

This parameter allows the user to ignore all packets that are received while not connected. Your screen will not be cluttered by traffic not intended for you. This may be useful to stations providing Remote Bulletin Board Services.

33 Maximum Packet Length

This parameter sets the maximum number of data characters that will be sent in one packet. If this number of characters has been sent to the TNC, and no other condition to send the packet has been met (idle timer or characters defined in parameter 3), the packet will be sent. Short packets are easier to receive under noisy conditions but very short packets on a busy channel will increase the traffic unnecessarily.

34 Network Header Second Byte

Parameter 34 was provided to allow experiments with basic networking control. As such, it is not used in this implementation.

35 Digipeet Control

This parameter is used to enable or disable digipeeting. The TNC will become a digital repeater if digipeeting is enabled.

36 Unused Network Control Parameter

37 Unused Network Control Parameter

38 Unused Network Control Parameter

39 RLSL Line Control

This signal is found on pin 8 of the RS-232 cable from the TNC to the terminal. With parameter 39 = 0, it is held at the "true" logic level (-12 volts). With parameter 39 = 1, RLSL will be at the "true" level only while connected. While disconnected, RLSL will be at the "false" level of -12 volts. This feature is particularly useful to stations wishing to provide Remote Bulletin Board Services.

If you wish to mask the most significant bit (bit 7) of each character transmitted, set parameter to 127. Set to 255 for full eight bit operation.



AMSAT Australia

NATIONAL CO-ORDINATOR

Graham Ratcliff VK5AGR

INFORMATION NETS

AMSAT AUSTRALIA

Control: VK5AGR

Amateur Check-in: 0945 UTC Sunday

Bulletins Commence: 1000 UTC

Primary Frequency: 3.685 MHz

Secondary Frequency: 7.064 MHz

AMSAT SOUTH WEST PACIFIC

Control: John Browning W8SP

Bulletins Commence: 2200 UTC Saturday

Frequency: 14.282 MHz

Participating stations and listeners are able to obtain basic orbital data, including Keplerian Elements from the AMSAT Australia Net. This information is also included in some WIA Divisional Broadcasts.

ACKNOWLEDGMENTS

Contributions this month are from Bob VK3ZBB, and the American Radio Relay League (ARRL) magazine QST January 1987. Thanks must also go to Ross Forbes WB6GRJ, for drawing my attention to this material.

Firstly, I would like to apologise for the delay in the promised second half of the article OSCAR at 25: Beginning of a New Era, by Jan King, AMSAT's Vice-President of Engineering, which was published in QST, January 1987. I had hoped that Colin VK5HI, would have returned from JA-land and, of course, the deadline slipped by as this one almost did for the same reason. From the article I quote: . . .

S3: PACKET GATEWAY INTERCONNECT

Packet radio is generally acknowledged to be the area in which amateur radio is currently experiencing the fastest growth. Nearly 20 000 packeters are now active, according to some sources. That's probably 10-15 percent of all active US amateurs. The proportion is expected to grow significantly in the last years of this decade. Local Area Networks (LAN) established around a digipeater hub have been linked to other LANs through VHF, UHF and even HF links. Coast-to-coast connectivity, albeit noninstantaneous, is now a fact. Messages dropped in specific packet radio nodes often reach an individual destination address in a day or less. And they arrive there error-free.

The growth of the terrestrial networks is progressing in a step-wise, part directed, part random pattern. Interconnection between widely separated digipeaters on the East Coast and West Coast and some places in between is now possible. But what if these LANs and groups of LANs could be linked by satellite into a continental or even multi-continental network? That's exactly what the S3 Packet Gateway Interconnect transponder is about. It could link dozens, even hundreds of packet gateways together with a high-speed trunk. While our initial calculations were made based on a 19.2 kbit/s data rate, the trunk bandwidth could even be up to 56 kbit/s and even if projected-use estimates indicate more resource is warranted.

Recreational use of the packet gateway transponder would, of course, be part of its mission statement. But there is much more to it than merely the digital ragchew, even the DX digital ragchew. Just as the essential "justifying" rationale for the S3 voice gateway interconnect transponder is the facility and capacity to provide unprecedented emergency communications capability, so, too, would the packet gateway interconnect transponder open new modes of public service. Today's amateur radio communicators are coming to well appreciate the tremendous benefits packet radio has over more traditional modes such as CW and even RTTY. Packet radio messages are error-free, high-speed and self-documenting. Traffic handling, routing, sorting, etc, can all be automated. The result is often remarkable improvements in traffic throughput, accuracy and, most important, communications

effectiveness. Portable packet terminals installed on jeeps, rescue trucks and the like are now appearing in and among forward-thinking amateur radio emergency-communications communities.

The S3 transponder aims to afford the emergency LAN a port to a wider community. As required, the field operations centre and even portables could communicate with regional or even national emergency-management centres to communicate status, request specific support and implement actions directed by headquarters via this channel. As with the S3 voice gateway interconnect, S3 would be suitable for recreational use, but earn its keep in providing unique emergency and general public-service communications resources as required.

S4: BROADCAST MODE GATEWAY INTERCONNECT

S4 is not a separate transponder, but rather a different mode of employment of the S3 voice gateway interconnect sub-transponder. By reallocating on-board resources, a broadcast capability of notable proportions could be established. As shown in Table 4, nearly 40 dB peak S/N ratio might be obtained using advanced SSB techniques. (Amplitude modulation, single sideband, ACSSB, is one means of achieving this very high level of S/N ratio performance). That's as good as, and in some cases better than, commercial telephone circuits.

The S4 Mode might be used for many routine and public-service activities. In routine use, ARRL WIAW bulletins might be sent to groups of terrestrial gateway repeaters. Listeners would use their VHF or UHF hand-held radios to tune in the bulletins on their local repeater. Groups of repeaters could be addressed selectively, say by time zone, by tone-encoded addressing. When a given repeater heard its address on the S4 mode downlink, it would interconnect the gateway's downlink receiver to the repeater transmitter to retransmit the audio to the repeater's coverage area. Local repeater operators could, of course, override the linking signal at will with local, manual intervention.

However, in the event of an emergency, groups of repeater gateways could be called up using the tone-activated alert scheme. In this way, news of regional or more general emergencies could be flashed to hundreds, even thousands, of repeaters in a few seconds. Imagine the improvements in emergency response afforded. When combined with existing emergency communications structures at the regional and the state level, the result could be unprecedented effectiveness in response to earthquakes, hurricanes, general tornado activity, sudden flood emergencies, and so forth.

On the more routine side again, the S4 mode could help unify amateur radio by facilitating the teleconference radio net concept, which to this point has relied on terrestrial telephone network linking of a hundred or more repeaters several times per year. Imagine this concept expanded to several thousand repeaters on line. Moreover, the equipment requirements for a S4 Mode Receive Only (RO) gateway are quite moderate. As shown in Table 3, a 1.5 metre dish with a single 2.4 GHz feed, a routine LAN and a mixer to a convenient IF are all that would be required. By the time the S4 mode files, one could likely establish an S4 RO gateway facility for \$300 or less!

S: THE MODE 5 VIDEO SUBTRANSPONDER

Advances in digital television and video data-compression techniques suggest to us there may at last be a good mesh between amateur television (ATV) and OSCAR satellites. Previously, constraints of power and bandwidth have made anything but very low resolution slow-scan television (SSTV) impossible on OSCAR. Now, however, using video data compression techniques we believe it possible to include a transponder capable of relaying digital video at the

Colin Hurst VK5HI
8 Arndell Road, Salisbury Park, SA, 5109

rate of perhaps 500 kbit/s. Commercial and military developments using comparable rates are very encouraging. Thus, we have every reason to believe these leading-edge techniques will be available to advanced amateurs by the time S4 is on line.

A more general view of the S3 transponder is that it is a general-purpose, high-speed transponder and that it could (should) be configured to handle the amateur radio equivalent of the Integrated Services Digital Network (ISDN) now being provided by telecommunications companies throughout the world. If this were done, bulk file transfer could be accomplished at astounding rates. The types of services that could be provided with the S3 transponder beyond these examples are numerous. Distribution of amateur radio software, articles and research papers are some examples that come to mind.

Using the S3 transponder as an ISDN facility for digital video, very high-speed packet, digitised voice, file transfer, some combination of these or some new, presently unforecast mode is a matter for our study teams and the amateur radio community to decide. But it seems clear that this area could be as fertile as our collective imagination.

MICROWAVE EXPERIMENT

A further model that could be included on board Phase 4 is a microwave-beacon experiment. Much work is being done using narrowband emissions as high as X-band (10 GHz). Imagine having a permanent 10 GHz beacon aboard AMSAT to align antenna feeds, tweak LANs and calibrate antenna positioning equipment. Such a field alignment tool might go far in advancing both interest and proficiency in the SHF bands. This experiment continues under study for possible inclusion.

CONCLUSION

Traditional OSCAR users have been a specialised lot. They have enjoyed the occasional esoteric challenges becoming highly proficient on OSCAR involves. Tracking and figuring access are not bothersome chores but rather part of the fun to this dedicated bunch. But clearly the view of what's fun and what's not depends on one's interest. Certainly, an emergency communicator is less interested in calculating access to a satellite than communicating his emergency traffic. So unless something changes, OSCAR use will remain a special art practiced by a relatively small group of aficionados.

But it is now abundantly clear that the nature of the satellite game is about to change dramatically with the advent of Phase 4. These changes come about through two fundamental reasons:

1) Maturation of OSCAR technology and technologists to where the media becomes transparent to the user, whereas previously the medium was in large measure part of the message (or reason for being on OSCAR). Thus, rather than evolve to further refinements of a traditional theme, OSCAR will be revolutionised to become a utility available to virtually anyone who wishes to participate. Acquisition of special equipment and skills will be minimised and, in essence, consolidated in the gateway concept. There, many participants can share the cost burden. The esoteric aspects of satellite communication can be offset and eliminated by more sophisticated engineering than has ever been incorporated. In sum, it is the highest form of the engineering discipline to make the inherently complex seem simple and generally accessible.

2) There is a growing, urgent need to make productive use of our incalculably valuable spectral resources. Where commercial interests see our UHF spectrum quite literally in terms of gigabucks (billions), you must be convinced the pressure to abscond with the heart of our hobby (our frequencies) will become enormous. We

simply must do better to justify our continued occupancy of the UHF bands, lest we lose them forever. Far from being the sounds of distant canons the threat is clear and present. If we don't move now, we could very well face significant challenges for our spectrum at the next World Administrative Radio Conference (WARC) — or even sooner if the FCC opts to change those secondary allocations. An amateur radio satellite using only UHF frequencies in providing real, tangible, demonstrable public service on a regular basis is one of the best ways we know to ensure we retain our spectral resources. Building Phase 4 and using it for the general public benefit is not just a further expression of altruism, then, but an element in the preservation of our most valuable resource — spectrum — for decades to come. We must make the best use of our UHF spectrum soon or it surely will be gone!

The challenge of Phase 4 is this: Come to understand the potential for unprecedented levels of public service and technical achievement; develop the plan to implement the system that manifests the potential and wisely manage the powerful resource that results. Is amateur radio up to this challenge? We obviously believe so, or we would not have brought this preliminary vignette to your attention. We sincerely believe Phase 4 will be operational in about five years and that it will forever change the nature of our hobby. To realise its full potential, however, substantial effort must be dedicated to first eliciting suggestions on meshing the strawman system with actual needs of the user community. For example, the operational requirements of the emergency communications community are best known by the emergency communicators. The direction and objectives of the packet radio activity are best known to the packeters, etc. Thus, one of AMSAT's main challenges is to "network" (establish working relations with) its system architects and engineers with the user communities.

To that end, AMSAT is briefing leaders in various amateur radio communities regarding the nature of the project and progress toward specific goals. Conversely, AMSAT is actively seeking suggestions on technical and organisational matters. Would-be participants should understand at the outset, however, that this is a long-term project that will require comparably long-term dedication by the participants. ATVers, microwave experimenters, repeater organisations, emergency communicators, traffic networks, etc. are invited to share their ideas on Phase 4 and potential applications. Invitations to participate in applications research studies will be issued in 1987 to individuals and groups who may contribute to the program. Expressions of interest may be sent to AMSAT, Phase 4 Program Manager, PO Box 27, Washington, DC 20044. (Please include a business-size SAE and postage if a reply is sought.)

Phase 4 can change amateur radio for the better by providing real public service while simultaneously providing space-age telecommunications to a broad cross-section of amateur radio. In that sense, it is not something that we want to do, but rather something we simply must do!

AMSAT membership is open to the public. Members receive the bi-weekly newsletter, *Amateur Satellite Report*, and other benefits. To inquire about membership and how to get started in OSCAR, send an SASE to AMSAT Australia, c/o Box 1234, GPO, Adelaide, SA. 5001.

FUJI TRAFFIC SAMPLE

The following is sample FO-12 Mode JD traffic from late February collected and forwarded to ASR by DB2OS.

(February 26, 1987)

fm 8J1JAS to BEACON cti UI pid FO JAS-1
RA 8702/28 20 00 06
263 557 730 735 794 879 892 864 003
379 648 002 614 631 616 617 616 617
668 001 688 699 703 697 835 676 926
492 000 000 010 111 100 000 100 000
001 100 001 000

(Further TLM-Frames are completely omitted to save space. . .)

fm DB2OS to CQ DX cti UI pid FO

fm ONUG to TEST via PASEFU cti UI pid FO

(Ohhh, a new station!)

fm DB2OS to ONUG cti SABB +

fm ONUG to DB2OS cti UA

(Let's try to connect him)
(He has received my SABB)

(First ON-DL on FUJI !)

fm DB2OS to ONUG cti 100 pid 00

hello dr om, this is peter from hannover

(1st Information Frame)

fm ONUG to DB2OS cti 110 pid FO

hello

(1st message from ONUG)

fm ONUG to DB2OS cti 111 pid FO

name freddy

(2nd info-frame from him)

fm ONUG to DB2OS cti 112 pid FO

in Ghent

(3rd info-frame from him)
(Control-Frames and retries now omitted. . .)

fm ONUG to DB2OS cti 113 pid FO

good copy

fm DB2OS to ONUG cti 141 pid FO

nice freddy 100% copy

fm DB2OS to ONUG cti 142 pid FO

no problem

fm DB2OS to ONUG cti 143 pid FO

you are the 2nd station on fuji !

fm ONUG to DB2OS cti 144 pid FO

73s

fm ONUG to DB2OS cti 145 pid FO

bye

(next 5 minute period)

fm 8J1JAS to BEACON cti UI pid FO JAS-1

RA 8702/28 12:10:02

598 596 714 718 786 890 864 003

371 647 002 616 631 625 621 622 623

688 001 713 726 719 695 676 926

546 000 000 010 111 100 000 100 000

001 101 001 000

fm DB2OS to G3RUH cti SABB +

fm G3RUH to DB2OS cti 100 pid FO

(Let's try it again!)

(Oh, nice! Jim's first Information-Frame, but I missed his UA-Frame)

fm DB2OS to G3RUH cti SABB

fm G3RUH to DB2OS cti 100 pid FO

(Next try to get an US. . .)

fm G3RUH to DB2OS cti 101 pid FO

fm G3RUH to DB2OS cti 102 pid FO

Hi !!

(ONUG also tries to connect G3RUH)

fm ONUG to G3RUH cti SABB

fm G3RUH to DB2OS cti 101 pid FO

(Now, here we are! !)

fm G3RUH to DB2OS cti DISC

fm G3RUH to DB2OS cti DISC

fm ONIKVH to CQ stl UI pid FO

(Oh, another station from Belgium on FUJI !)

fm DB2OS to G3RUH cti SABB +

fm DB2OS to G3RUH cti SABB +

fm DB2OS to ONIKVH cti SABB +

fm G3RUH to DB2OS cti UA

fm DB2OS to ONIKVH cti SABB +

fm G3RUH to DB2OS cti 100 pid F

fm G3RUH to DB2OS cti 101 pid FO

Hi Peter! ! ! >>

fm DB2OS to G3RUH cti 120 pid FO

hello jim!

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

(Next try to get an US. . .)

fm G3RUH to ONUG cti SABB

fm ONUG to G3RUH cti UA

fm DB2OS to ONIKVH cti SABB +

fm G3RUH to ONUG cti 100 pid FO

Hi Freddy ! ! ! >>

fm G3RUH to ONUG cti 100 pid FO

Hi Freddy ! ! ! >>

fm DB2OS to HB9XJ cti SABB +

fm DB2OS to ONIKVH cti SABB +

fm G3RUH to ONUG cti 100 pid FO

Hi Freddy ! ! ! >>

fm DB2OS to HB9XJ cti SABB +

fm DB2OS to ONIKVH cti SABB +

fm G3RUH to ONUG cti 100 pid FO

Hi Freddy ! ! ! >>

fm DB2OS to HB9XJ cti SABB +

fm ONIKVH to DB2OS cti 101 pid FO

godd day first qso

fm G3RUH to DB2OS cti SABB

fm DB2OS to G3RUH cti UA

fm DB2OS to ONIKVH cti 100 pid FO

hello om, name peter and qth near hannover ja42vg

fm ONIKVH to DB2OS cti 112 pid FO

fm G3RUH to G3RUH cti 100 pid FO

hi jim >>

fm DB2OS to ONIKVH cti REJD

(Fuji switched OFF Mode-JD, all QSOs are broken OFF ! !)

next JD-Orbit. . .

fm 8J1JAS to BEACON cti UI pid FO

JAS-1 RA 8702/28 16:00:12

195 580 692 703 756 879 889 864 003

47 002 606 617 617 617 617 617

001 709 705 712 706 674 677 925 581

000 000 010 111 100 000 100 000 001

111 011 000

fm G3RUH to CQ via FO-12 cti UI pid FO

fm DB2OS to CQ DX cti UI pid FO

(etc. . . QSOs)

(next 5 minute period)

fm 8J1JAS to BEACON cti UI pid FO

JAS-1 RA 8702/28 16:10:00

204 563 703 707 763 878 891 864 003

351 647 002 606 619 615 612 613 613

668 001 714 708 711 613 676 678 926

583 000 000 010 111 100 000 100 000

001 101 100 000

fm G3RUH to DB2OS cti SABB

fm ONUG to CQ via VIA CH-3 JAS-1 cti

UI pid FO

fm ONUG to G3RUH cti SABB

fm G3RUH to ONUG cti DM

fm DB2OS to G3RUH cti 100 pid FO

hello jim!

fm G3RUH to ONUG cti 100 pid FO

cBack again — what a handful! ! >>

fm ONUG to G3RUH cti 111 pid FO

qsb on jas ? ?

fm DB2OS to G3RUH cti 101 pid FO

yes, very hectic

fm DB2OS to G3RUH cti 102 pid FO

I'm now on .850

fm G3RUH to ONUG cti 102 pid FO

Not much — abt 6 db >>

fm ONIKVH to CQ cti UI pid FO

fm ONUG to G3RUH cti 122 pid FO

ok. . . here sometimes too >>

fm ONIKVH to CQ cti UI pid FO

fm G3RUH to DB2OS cti DM

fm G3RUH to ONUG cti 132 pid FO

Peter is calling too >>

fm G3RUH to ONUG cti DISC

fm HB9XJ to HB9XJ cti SABB

fm DB2OS to ONIKVH cti SABB +

fm G3RUH to DB2OS cti SABB

fm DB2OS to G3RUH cti UA

fm HB9XJ to HB9XJ cti UA

fm DB2OS to ONIKVH cti SABB +

fm DB2OS to G3RUH cti SABB

fm ONUG to CQ via VIA CH-3 JAS-1 cti

UI pid FO

(Try to connect HB9XJ and ONIKVH. . .)

(1st I-frame from ONIKVH)

(Jim connects me and my TNC-1 answers. . .)

(my 1st I-frame to ONIKVH)

next JD-Orbit. . .

(First HB9-Stasiun! ! !)

(With first Path to USA!)



Spotlight on SWLing

Robin Harwood VK7RH

52 Connaught Crescent, West Launceston, Tas.
7250

fm KAGLNV to G3RUH cti SABM +
fm W3WVI to G3RUH cti I22 PD
gud to work u

fm W3WVI to G3RUH cti I22 PD
this stuff really does work

fm JAS-1A to BEACON cti UI PD
JAS-1A 870228 20.0110
212 579 680 686 739 877 889 882 003
333 847 002 591 617 615 612 612 613
688 001 714 709 715 708 855 677 925
626 000 100 110 111 100 000 100 000
001 001 110 000

fm KAGLNV to G3RUH cti SABM +
fm G3RUH to KAGLNV cti DM

fm G3RUH to W3WVI cti I32 PD
errific A first? >>

fm DB2OS to W3WVI cti SABM +
fm W3WVI to DB2OS cti DM

fm W3WVI to G3RUH cti I33 PD
has a couple 04, this is first
intercontinental qso

fm G3RUH to W3WVI cti I43 PD
Yea way out Howie Ga Tom >>

fm G3RUH to W3WVI cti I44 PD
Gosh 4 count c q >>

fm W3WVI to G3RUH cti I54 PD
also see on6

fm KAGLNV to ON6UG cti SABM +
fm ON6UG to KAGLNV cti UA

fm DB2OS to KAGLNV cti SABM +
fm KAGLNV to DB2OS cti DM
fm W3WVI to G3RUH cti I55 PD
also db2os.

fm KAGLNV to ON6UG cti SABM +
fm W3WVI to G3RUH cti I56 PD
let me work him

fm W3WVI to G3RUH cti I57 PD
F0

fm W3WVI to W3WVI cti I05 PD
Maywell be

fm W3WVI to G3RUH cti DISC
fm ON6UG to KAGLNV cti I06 PD
name Freddy qth gent

fm W3WVI to DB2OS cti SABM
fm DB2OS to W3WVI cti SABM +

fm DB2OS to W3WVI cti UA
fm W3WVI to DB2OS cti DM

fm DB2OS to W3WVI cti I00 PD
hello tom

fm W3WVI to DB2OS cti I10 PD
FI we made it!

fm DB2OS to W3WVI cti I01 PD
nice to see you

fm W3WVI to DB2OS cti I11 PD
great!

fm DB2OS to W3WVI cti I22 PD
my 1st qso d/w

fm DB2OS to W3WVI cti I23 PD
great!!

fm DB2OS to W3WVI cti I24 PD
u/b

fm W3WVI to DB2OS cti I22 PD
gud to work u peter

fm W3WVI to DB2OS cti I23 PD
this is TAPR mode prototype

fm DB2OS to W3WVI cti I32 PD
my 1st qso d/w

fm W3WVI to DB2OS cti I23 PD
this is TAPR mode prototype

fm DB2OS to W3WVI cti I45 PD
many traffic now... hi

fm DB2OS to W3WVI cti I46 PD
fine, im using original ja with some
your mode

fm DB2OS to W3WVI cti I47 PD
how many stations are active in usa on
9p?

(End of transcript)

—de Graham VK5AGR

Well, we are right into Winter now and conditions have rapidly altered. Now we are hearing signals from Europe during our local daylight hours, while high frequency propagation has dropped off during the evening hours. It pays to keep an ear on the lower frequencies around 0200 UTC for signals coming in across Antarctica from Europe, with signals from DW and Radio Berlin International especially prominent. You will notice some auroral flutter on them, particularly on the 49 metre broadcasting allocation.

By now, many of you will have heard Radio KSDA, in Guam. This station, owned by the Seventh Day Adventist Church, has been plagued with delays caused by unseasonal weather in Guam, to the erection of antennas and installation of equipment. At deadline time, they had been heard with test tones and expected to commence broadcasting in mid-March.

Another private American International Broadcasting, WCBN, in Massachusetts, USA, also should be operational by now. This station is owned by the influential Christian Science Monitor, in Boston. I believe that it will carry news and information. The same organisation also brought out Radio KYOI, in Saipan. This has been carrying contemporary rock and pop music, primarily to Japan, but they have indicated that they had no plans yet to link the two stations.

To get the current information as to the operating times and frequencies of these new stations, I would strongly recommend you check the various DX programs or consult the current *International Listening Guide*. The once current information I have is now out-of-date.

And, while we are on the ILG, some months ago I may have mentioned that they were going to publish a 320 page *International Broadcasting Handbook 1987*, due for release around January. Advance prices were quoted and a number of

orders received. On February 12, Media Network announced the handbook was not going to be published this year, after all. Apparently printing delays were given as the principal reason why the project was cancelled. Bernard Fiedewald, the editor, has said that he would be handing refunds to those who had ordered in good faith. To quote the March edition of the *Australian DX News* — "It seems that there is more involved in DX publishing than meets the eye."

Several years ago, I was one of many DXers and SWLs caught in a subscription to a Finnish edited publication called *Voices*. It was primarily devoted to forthcoming programs over international radio stations. After about six months, it folded and was declared bankrupt, failing to get sufficient information or advertising to pay its way. Quite a number paid advance subscriptions through clubs, etc. Now I hasten to add that I am not implying this was the case with ILG, as they have had a very good track record with their quarterly *World Frequency Survey*. I do advise that you do check with experienced DXers and clubs before advancing subscriptions to some of the newer publications.

I was recently also caught with a local mail order firm with an order for non-technical books. The firm/bookshop went out of business while my order was being attended to. Another firm took the order over and partially filled it, yet I was caught making a double payment. It is doubtful if I will be able to recoup the over-payment as the original company has been dissolved. It does pay to be extra careful.

March 11, saw a very historic anniversary in the history of shortwave broadcasting. It was the first broadcast on telephony from Eindhoven, Holland. The Philips laboratory built an experimental 35 kW transmitter on 30.200 metres and commenced broadcasts on that date over station PCJJ. It was heard in Bandung, then in the Dutch East Indies (now Indonesia) and resulted in regular international broadcasts. Sixty years has now elapsed since then and *Radio Netherlands* still operates, although it has been independent of Philips for many decades.

I do not think it was the first broadcast on telephony over shortwave, as I have a very hazy recollection that the Empire Broadcasting Station, forerunner to the General Overseas Service broadcast the *Remembrance Day Service* from the Cenotaph, Whitehall in 1924. As well, I think that the forerunners to our ABC aired descriptions of the 1925 Test Series in Melbourne over shortwave.

Just as I was preparing this column, I came across another clandestine station. It is hostile to the present regime in Iran. The call sign is *Radio-ye Zhamakshen — Irani*, or Radio Iran Toleers. It is in Farsi (Persian) and was observed at 0325 UTC on the unusual frequency of 10.870 MHz. According to the March *ADXX*, the station is sympathetic to the banned *Tudeh*, and is reportedly from Afghanistan. As most senders carrying Radio Afghanistan are based within the USSR I would consider this sender is also located there. The station is on 10.870, 6.125 and 4.775 MHz from 0230 to 0330 UTC and 1530 to 1730 UTC. The lower channels, presumably, would be better heard on the latter release.

Just in closing, I came across another DX program, Radio Prague in Czechoslovakia. I heard it at 0345 UTC, Friday, on 11.990 MHz in English to North America. You can also try 7.345 MHz at the same time as Prague is coming in well on that channel as I write this column.

Well, that is all for this month. Until next time, the very best of 73 and good listening!

—Robin VK7RH

SATELLITE ACTIVITY FOR THE MONTH OF JANUARY 1987

1. LAUNCHES

The following launching announcements have been received:

INTL NO	SATELLITE	DATE	NATION	PERIOD min	APG km	PRG km	INCL deg
—1987							
001A	Meteor 2-15	Jan 05	USSR	104.0	973	950	82.5
002A	Cosmos 1811	Jan 09	USSR	89.7	367	181	56.0
003A	Cosmos 1812	Jan 16	USSR	92.8	367	644	82.5
004A	Cosmos 1813	Jan 15	USSR	90.0	367	208	72.8
005A	Progress 27	Jan 16	USSR	88.9	280	189	51.6
006A	Cosmos 1814	Jan 21	USSR	100.7	815	775	76.8
007A	Cosmos 1815	Jan 22	USSR	95.5	553	345	56.7
008A	Molniya 3-31	Jan 22	USSR	121.5	4080.0	473	32.8
009A	Cosmos 1816	Jan 29	USSR	104.9	1024	979	82.9
010A	Cosmos 1817	Jan 30	USSR	88.4	224	192	51.6

2. RETURNS

During the period 21 objects decayed including the following satellites:

1986-087A	Cosmos 1792	Jan 05
1986-099A	Cosmos 1807	Jan 23
1986-010A	Cosmos 1817	Jan 31

In addition, a further 22 objects are now reported decayed in earlier periods.

3. NOTES

1987-005A Progress 27 carried expendable materials and varied cargo for the orbit station MIR.

1987-008A Molniya 3-31 has on-board communication equipment designed for long-distance telephone, telegraphic radio and television broadcasting.

1987-001A Meteor 2-15 has on board equipment for obtaining global pictures of cloudiness and of the underlying surface in the visible and infrared ranges of the spectrum.

—Contributed by Bob Arnold VK3ZBB



Listening Around

Joe Baker VK2BJX
Box 2121, Mildura, Vic. 3500

Because of a shortage of shipping, it was impossible to collect us from Morotai until almost a year after the war was over. By the time we reached Sydney in the *Kanimbla* the cheering was all over. One of the last units to leave Morotai was the Army Amenities Broadcasting Unit (9AD). The Army newspaper *Table Top* (1st Australian Press Unit) had been forced to close down when the newspaper rolls became saturated with water.

Sergeant Major Barnett was on duty for the last broadcast and the technical boys were gathered around the transmitter ready to take it apart as soon as the last strains of God Save the King had died away for the last time. They worked through the night and by morning, everything was in pieces ready to be placed aboard the *Kanimbla*. A portable transmitter, (10 watts) the *Voice of North Borneo* was already on its way by ship to Morotai, and for this reason, the military style cigar-shaped transmitting masts of 9AD were left in place.

Radio station 9AO was actually a ship's emergency transmitter which had been fitted into the back of a military truck and equipped with two turntables and microphones. Warrant Officer Spencer was in charge of this unit and he eventually went to the BCOF Forces in Japan.

All of our 2000 records were left for 9AO to use. (They probably included one which was played frequently on 9AO — Don't Fence Me In by the Andrews Sisters).

I still recall the trip back on the *Kanimbla*. We came back south of New Guinea through the Arafura Sea. As we left Morotai, the distant volcano in the Halmaheras could be seen smoking ominously. The three native boys who did our washing, Bernades, Martin and Senanggi, had bid us a sad goodbye just before we left. We had fitted them out with odd pieces of military uniform and boots and gone down to the shore where they packed everything in their lakatoi (native boat) and bid us a tearful farewell.

They left across the water to the island of Melita and were halfway across when they were forced to

return because of a stormy sea. This meant they had to spend another night with us and the same procedure, with more tears, was repeated the next day.

The trip to Sydney took about two weeks and life aboard the *Kanimbla* was not as enjoyable as the outward trip on the American *Frederick C Ainsworth*, particularly the food aspect was not as good. On the American ship we were served counter-lunch fashion with divided trays and a choice of food. On the *Kanimbla* we had army mess tins and food like bully beef and dog biscuits. (Since my Army days I have steered well-clear of bully beef — which is quite expensive now anyway — and I certainly shy away from baked beans and dog biscuits!).

I well remember when we came within sight of Cape York — a few trees which appeared to come down to the water line and not very much else. It was our first glimpse of Australia for almost a year and it did us a world of good to see that landfall.

I also remember the Army barbers aboard the *Kanimbla*. All that was required to qualify as an Army barber, and make some extra money to supplement the meagre pay, was to get yourself a stool for the customers to sit on, a comb, pair of scissors and mirror and you were in business. It was necessary to have a certificate from the Barbers Association, or whatever, and the charge made was usually something agreeable between yourself and your customer — usually about a "zack" (sixpence or 5 cents in decimal currency).

As we came down off the coast of Queensland, still within the tropics, some of the boys elected to sleep on deck and admire the stars.

As we journeyed further south we were told we could send *Marconigrams* from the ship so I sent a wire to my aunt, in Sydney, telling her that we were due to arrive at Walsh Bay in a day or so.

When we arrived at Walsh Bay there were very few people on the wharf to welcome the returning troops and my aunt was not among them. I found

out later that my brother Frank, who was in the RAAF, planned to meet me but had mistaken the wharf! However, I spotted a newsboy nearby and arranged for him to telephone my aunt, but again by disembark time there was still no one to meet me. I also discovered, just before leaving the ship that someone had stolen the American loud-speaker I had acquired on Morotai. (Not a very good homecoming!). However, I still had my Samurai Sword — and still have today, 40 years later.

We were collected from the wharf and I cannot quite remember where we were taken to. I may have been to the LTD (Leave and Transit Depot), at Adison Road, Marrickville.

Although the war was over, the Army held on to us and we were discharged on a points system. To fill in time whilst awaiting discharge I was posted to an Army Amenities Unit at 113 RGH Concord, which is now a hospital for civilians. My job here was to issue tennis racquets, cricket bats and other various types of sporting equipment to soldier patients who were able to walk. Also, I had to be in the wings when live concert parties entertained the patients at the hospital.

Here I came to see how Hal Lashwood and Roy (Mo) Rene did their ABC Press Gang Broadcasts. They were broadcast from the same theatre, sound effects men and all. These live artist shows by Roy Rene and Hal Lashwood were well received by the soldier patients.

Time passed and I was sent to the Sydney Showground Agricultural Pavilion to be released into "civvy street." They had calculated my deferred pay and gave me a £6 Dedman suit (which was the standard type of suit everyone was given) to make up for the one lost when one enlisted.

I was discharged on a momentous day — July 4, 1940, American Independence Day, and I was left to make my own way along "civvy street" — a personal war of my own which is another story.

MORSEWORD 2

Compiled by Audrey Ryan
Wife of Joe VK3ABA

ACROSS

1. Some Italian notes
2. Perspiration
3. Vehicle
4. Shoot
5. Sphere
6. Tibetan monk
7. Extracts ore
8. Native of Turkey
9. Wage
10. Mature

DOWN

1. Egg on
2. Small ship
3. Keen
4. Lease
5. Payments for premises
6. Part of a bird
7. Move through water
8. Small nail
9. Happen afterwards
10. Soft food for babies

© Audrey Ryan 1987

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Solution page 62. . .



Pounding Brass

Gilbert Griffith VK3CQ
7 Church Street, Bright, Vic. 3741

I'll bet you "looney tunes" out there think that I am a loony too! And you would be right. I mean, who goes without a beer all week just for a new piece of coaxial cable?

Not to mention all that expensive equipment in the shack, probably costing more than the family car. It is not just other amateurs who think I'm a little "nutty" though. I have been hang-gliding for 12 years as well! Trying to make people understand that taking off (called "jumping" off by the uninitiated) from Mount Buffalo Gorge is easy and safe is just a big waste of time. If you want to fly, you do the training and away you go.

Similarly, trying to get someone to learn Morse code is an uphill task. Comparing Morse with learning to walk is unfair, because we don't need Morse! How do you convince them that it is easy, quick and fun? Like jogging. You can't. Aside from a bit of bullying by the establishment in making CW a compulsory subject for a licence, there is very little you can do.

Let's face it, unless there is "something in it for them," it is almost impossible "learning" anybody anything.

If you are reading this you probably enjoy radio as a major hobby. If you are old enough, you may remember how radio started. Briefly, one would hear or see a radio in action and immediately rush home to build a crystal set — then rushing out again and asking questions left, right and centre because it didn't work. There were no kits, no television, and not much broadcast radio. You had to learn a bit of electronics or you didn't get off the ground.

The situation today is more like rush, rush, rush, earn, earn, spend, spend, spend. Now that you are an amateur you may have sweated over the CW broadcasts and sweated up on the Regulations and then ticked a few boxes to get your piece of paper. Now, all of a sudden, it is two metre repeaters, DXing, satellites, EME, CW, HF, VHF, UHF, RTTY, ATV, packet, mobile, portable, contests, awards, intruders, conventions, field days, nets, scheds, home-brewing, antennas, test equipment, TNCs, computers, modems, third parties... Help!!! Is it any wonder that Knights of the Key are a rarity? And how many amateurs do you know who got on the air as much as they would like to? Especially the "loonies" who also try to participate in the clubs, institutes, QSL bureaus, magazines, and JOTA. You hardly ever hear them. Even my CW is getting rusty, and I do as little as possible of the above!

Who are we to bully people into a pigeon hole at the expense of all others?

If most amateurs want to throw away the key as soon as they get their licence, forgetting their hard-earned knowledge, let them. I know it is a bit annoying when you are QRLed by a phone operator, and he can't remember enough CW to hear your QSY!

If... there was a new class of licence that started with CW only it might pull in a few new members. Then they would discover for themselves what brass pounding means. Maybe the Russian system is better, who knows?

Wouldn't it be a snap to pass a CW only examination, with no SSB, nothing really complicated at all. But I wouldn't count on the computer groups going for it.

Boy Scouts (or Girl Guides) with a special, low power CW licence and say, 1.800 to 1.810 MHz of band to play with is my idea of a saleable idea. Home-brew equipment only with a cheap examination (taken by an amateur?) and no licence fee, because the knowledge is an asset for the whole country, not just for amateur radio. If I hear the 'top-banders' screaming, just have a listen to that segment of the band in the evenings, not a soul. And it is a challenging band. The more I think about it the more I think it is a good idea. Do you? If there was enough response we might actually get something done.

And now... something you have all been waiting for.

Circuit modifications for the EA78 Accu Keyer (see AR February, page 6 for circuit).

- 1 Put a second diode in series with CR1.
- 2 Change C1 to .18 uF (add .082 uF).
- 3 Change C2 to 22 pF.
- 4 Change R1 to 150 k.
- 5 Change R2 to 150 k.
- 6 Change R3 to 270 k.
- 7 Change R4 to 150 k.
- 8 Try putting in a DPDT switch to change the sense of the paddles for working with your 'other' hand!

I also have a circuit for a weight control which I have not tried, I will describe this if there is an interest shown.

I am pleased to announce that I have received two letters so far (in mid- February) from brass pounders.

Neil VK3LJ, is concerned about the high failure rate in the code examinations and the large number of amateurs who do not use code. Hence this article.

And Steve VK3JY, is looking for a sympathetic ear for that all-important first CW QSO. (I will be phoning him tonight). I will attempt to compile a list of beginner nets for those, like Steve, who are extra shy about that first QSO, as I can only help a few myself.

Try having a list of things you may need to send, and keep it in front of you so that you can send from the printed word for the first few QSOs. By the time your nerves settle down you will be ready to send "off the top" and won't need the notes. I still write the occasional word down that is difficult to spell "off the top."

An easy way to start is to forget about calling CQ and tail-end someone who you find easy to copy. You can get away with this method of making-contact for years if you want, and it assures that you will be able to copy the other station without having to make up stories about QRN or families, etc.

Spend a few minutes every day sending to yourself, maybe out of a book you are reading. Better still, send to a tape recorder and see if you

can copy the play-back. Don't worry about speed, but go as fast as you can without making too many mistakes. Then, when you go on air you can slow up a little and really send well.

Unfortunately, I cannot remember ever having worked Marshall on the air. But anytime you happen to hear me, do not hesitate to give me a call. If you can stand the mistakes I make, I will be more than happy to have someone to rag-chew with, together with those I already know. I really love those break-in rag-chews that sometimes go on for hours, with people dropping in to say hello or just to test a new antenna or even to spread a piece of gossip! Try it, you will find that nearly everybody on a particular band knows everybody else and even something about their families.

Maybe that is why we are 'Knights of the Key!' I hope you can join in the fun.

—73, Gil



FACES BEHIND THE KEYS

On December 28, 1986, some of the 80 metre CW operators got together for an "eye-ball" come-social occasion. This meeting was held at the QTH of David VK3DVV, who had prepared a sizzling barbeque and cold 'fridge. Needless to say, a grand time was had by all (including the wives). Most of the operators pictured are regulars on the Friday night CW net. The topic of conversation — Brass Pounding of course!

From left: John VK3PIZ, Bryan VK3BNO, Les VK3BPW, Harvey VK3AHU (Early Bird Net), Bob VK3AQF, John VK3CAL, Laurie VK3CWB and David VK3DVV.



Club Corner

SUNSHINE COAST AMATEUR RADIO CLUB

The Sunshine Coast Amateur Radio Club represents amateurs within an area, extending from Caloundra to Maleny/Malepton and Tewantin/Moosa. The organisation has over 60 members, comprising in 1986 of — 34 Full Calls, 14 Novices, nine Limited/Combined and six unlicensed operators. The Club was formed in 1970 with the aim of promoting amateur radio in this area.

Following a recess, it was reformed in 1978 under the leadership of Colin VK4CY, who remained active within the executive until his untimely death in 1986. The Colin McCamley VK4CY Memorial Shield honours the former President, and is awarded annually for service to the Club.

The Club operates a weekly net each Thursday evening, at 0900 UTC, with the call sign, VK4WIS. The net is directed by VK4AEM, Net Co-ordinator. The Club's "Pelican Award" can be obtained by calling in on this net. The WIA news is relayed by the club's VHF repeater each Sunday morning at 2300 UTC, followed by a call-back and club news under the direction of Jeremy VK4ZCC.

A repeater service is maintained on VHF and UHF, using frequencies of 146.850 and 438.075 MHz with the call sign, VK4RSC. An operational diplexer is also operational. Call sign VK4RSA is yet to be confirmed by the DOC. The repeater systems use innovative technology developed by Technical Officer, Roy VK4ARU, and are all radio remote-controlled.

The annual program of events has followed a set format for some years with the AGM in February. In June, the club receives a visit by representatives of the WIA Bookshop and the Federal Delegate, who reports directly to the membership. August is Club Auction Night, which is always popular.

The year ends with a Christmas barbeque. Full use is made of video tapes with the subjects not necessarily related to radio.

Club President is Paul Dunford VK4BPD. Further information about the Club may be obtained by writing to the Secretary, PO Box 90, Nambour, Qld. 4560.

—Contributed by Joe Ellis VK4AGL, Secretary

SOUTH EAST RADIO GROUP INC

The South East Radio Group will be holding its popular Annual Convention again in June this year. This is the 23rd Convention held by the group in Mount Gambier.

The convention attracts much interest due to the many interesting trade displays kindly staged by the various companies involved in the retail of amateur related equipment. There are, of course, the ever popular competitions. Such events as fox hunts, hidden transmitter hunts and scrambles, to name a few, are available for those interested in competing for exciting prizes and the perpetual trophy. Of course, it should not be forgotten that the renewal of old acquaintances and the meeting of those faces behind the microphone is, to some, the most important part of all.

The convention starts on Saturday, June 6, with registration and a few events. The Sunday sees most of the serious contesting and the famous Lunch and Tea organised by the hardworking ladies. It really is a must to come along to Mount Gambier on this weekend and join in the fun.

Mount Gambier is situated on the side of an extinct volcano, the Blue Lake, about halfway between Adelaide and Melbourne. There is much to see and do in this lovely city, so come and stay

a few days while you are in town for the convention. Accommodation is normally plentiful, but as the city plays host to many sporting events, etc, on this the Queen's Birthday Weekend, it is a good idea to book early.

For a full program, accommodation guide and any other queries, please write to the SERG Inc, PO Box 1103, Mount Gambier, SA. 5290.

—Contributed by David Edwards VK5SF, Secretary, SERG

NORTH WESTERN BRANCH

Meetings of the North Western Branch are held on the second Tuesday of each month at the Penguin High School, beginning at 7.30 pm. Meeting are brief and are followed by an activity or topic of interest and supper.

Activity and club stations nights, club call sign VK7NW, are usually every second Friday at PHS, 8.00 pm.

Interests within the Branch include HF Operation, ATV, Special Communications, Antennas and Computing.

Visitors are welcome at meetings and activity nights.

For further information contact John Webster VK7KDR, President, or Tony Clayton VK7AH, Secretary, (phone 24 5375), or write to the North Western Branch, PO Box 194, Penguin, Tas. 7318.

—Contributed by Tony Clayton, Secretary, North Western Branch

ANNUAL FIELD DAY — PORT MACQUARIE

Queen's Birthday Weekend, June 6-7, 1987 will unveil the 15th Annual Field Days to be conducted by the Oxley Region Amateur Radio Club, at Port Macquarie.

The two days of amateur radio activity will once again see a packed program of popular attractions. In fact, the Oxley Club will repeat last year's best-ever program with one or two additions.

OXLEY MOBILE AWARD

An excellent unique award, designed to encourage contacts with other stations whilst travelling to the Port Macquarie Field Days each year. It suits all contestants and a good concentrated effort is required to log 25 station and capture the award certificate. Not easy — but really worthwhile and good fun!

FOXHUNT CHAMPIONSHIP

The "Oxtales Cup" Foxhunt Championship will once again bring out the foxhunting boys complete with wizardry and knowhow — plus all the excitement as the hounds charge off! There are four foxhunt championship events on Saturday and a further four on Sunday. A points score system applies and the trophy is great. The first championship event starts at 1400 on Saturday — be early please.

CW SENDING CONTEST

This is becoming a very popular event and is a test of ability to send CW accurately, irrespective of speed. You can enter between 1000 and 1500 on Sunday.

REGISTRATIONS

The Registration Desk opens at 1000 on Saturday and 0900 on Sunday. Super prizes are awarded for Lucky Registration winners with more lucky hour prizes available.

SURPLUS GEAR SALE

The ever-popular Surplus Gear Disposals Sale runs continuously through both days. Oxley Club does not charge any commission and the disposals are made by personal negotiations. Buyers are usually ecstatic! Trade Stands and the WIA Book Stall are also available.

There is plenty of activity at Port Macquarie Field Days where the emphasis is on catering for the family. Home-brew, QSL card, old gear, handy kinks, computer programs are some of the other popular contests for amateurs.

Quizzes, crosswords, mystery objects, handcraft, lucky dips are the contests to keep the rest of the day happy. Coffee and tea are served continuously on both days — free of charge. Also, you will see an ideal QTH location for the Big Days. The RSL Youth Hall at Port Macquarie is situated right at Oxley Beach, with Oxley Sports Oval for the children to exercise nearby. A truly beautiful location.

PROGRAMS

A large number of programs are posted each year. Should you require a copy contact the Club Secretary, Lester O'Connell VK2BFR at The Oxley Region Amateur Radio Club, PO Box 712, Port Macquarie, NSW 2444. Phone (065) 83 1100.

—Contributed by Lester O'Connell VK2BFR, Club Secretary



QSP

DELONG'S LAWS OF NETWORK PROGRAMS

1. Projects progress quickly until they become 90 percent complete, then they remain at 90 percent complete forever — it is called the transitional operations and maintenance (TOM) period.

2. One advantage of fuzzy project objectives is that they let management avoid embarrassment of estimating the corresponding costs.

3. Project teams detest progress reporting because it vividly manifests their lack of progress.

4. When project milestones appear to be met, management must have overlooked something.

5. If everything seems to be going well, you obviously don't know what's going on.

6. If project content is allowed to change freely, based on external requirements, the rate of change will exceed the rate of progress.

7. There is never enough time to do it right the first time, but there is always time to do it over.

8. Interoperable and back-up systems ... won't; they just cost more to implement.

9. In consideration of reliability, fail-safe circuits will destroy all others.

10. Build a system that even a fool can use, and only a fool will use it.

11. It is impossible to build a foolproof system because fools are so ingenious.

12. A system built to specifications will inevitably pass all system development tests and operational tests, yet fail to do the job the user needed.

13. The greater the importance of decisions to be made, the larger must be the committee assigned to make them.

14. Everyone relies on committees, because if more than one person is responsible for a miscalculation, no one will be at fault.

15. The more urgent the need for decision, the less apparent becomes the identity of the decision-maker.

16. Enough research will tend to support your hunches, now called conclusions.

17. Concerning the need for network sustaining engineering, the more complex the concept, the more simple-minded is the opposition.

From KH8BZF Reports February 3, 1987

A genius unable to express himself is no better than a silent fool.

From KH8BZF Reports January 20, 1987

REGISTERED BUILDER

(DORAZ PTY. LTD.) TRD.

A.J. & J. COMAN

BUILDERS & DESIGNERS OF:

- NEW HOMES • EXTENSIONS
- RENOVATIONS & ADDITIONS
- CUSTOM BUILT KITCHENS
- BATHROOMS • BACK HOSE HIRE
- 57 BULLA ROAD, BULLA. 307 1392



PUBLICATIONS OF INTEREST

The first edition of the *International Awards Guide* was printed on December 15, 1986. The guide consists of 434 large A4 size typed and offset printed pages. There are 1027 awards described therein (rules, size, colours, cost, address, etc), together with 371 illustrations and a listing of 116 valid stations, countries, cities, etc.

Cost of the guide is US\$34 or 58 IRCs. The *DX Bulletin* is issued 11 times per year (monthly, except August) by the Radioclub Ypres of Belgium. A regular issue has 12 pages with up-to-date coverage of DX events. New DX information is included in the bulletin up to two days before mailing.

A sample copy of the bulletin (air mail) costs US\$1 or two IRCs. A subscription is US\$10 or 17 IRCs for 11 issues (surface mail) or US\$11 or 19 IRCs (air mail).

For further information or copies of the above publications, write to the Secretary, Radioclub Ypres, PO Box 32, B-8900 Ieper, Belgium.

—Contributed by Chris Vermote ON4CZV, Secretary, Radioclub Ypres



The world famous Icom IC-2A, the single biggest selling hand-held in the world, the transceiver that turned hand-held technology upside down with thumb-wheel synthesised frequency control, has evolved yet again to lead the portable race with the state-of-the-art equivalent to thumb-wheels, block control micro-switches.

The palm-sized IC-u2A, measuring just 58 x 140 x 29 mm (VHDD), uses a series of three micro rocker switches to select frequencies in the range of 144 to 148 MHz in steps of 1 MHz, 100 kHz and 10 kHz, or by using the UP/DOWN scan button, this unit will scan the entire band in increments of 5 kHz.

Ten memories store your favourite simplex channels or repeater outputs. Standard repeater splits of -600 and +600 kHz are selectable from a rear panel switch. Memory channels can be easily recalled using another micro rocker switch on the top panel.

Frequency and memory channel in use are displayed on the large, easily read soft green LCD display. Night time use is enhanced with the inclusion of a display backlight, operated by a mini-switch conveniently located directly below the PTT switch. A slide switch adjacent to the PTT switch allows frequency locking to guard against accidental off-frequency operation.

The receiver circuit uses a dual conversion design with IF frequencies of 16,900 kHz and 455 kHz combined with a multiple stage FET front end for outstanding sensitivity (less than 0.25 μ V or -12 dBu for 12 dB SINAD) and selectivity (plus more than 60 dB rejection of spurious signals).

The transmitter section uses a three stage power amplifier circuit to produce one watt RF output (selectable to 0.1 watts) into a very short, high efficiency, flexible antenna, for a battery pack power drain of only 600 mA on full transmit.

A 'power save' feature in the IC-u2A reduces idle receive condition power consumption to a tiny six milliwatts by signal sampling after 30 seconds in the idle state. Normal functions are resumed immediately if the transceiver is operated or a signal is received on the monitored frequency.

A range of optional extras is available for the IC-u2A.

The ultra-compact IC-u2A is on display at your local Icom dealer now, where it will soon be joined by the IC-u4, a 70 cm version with the same outstanding features as its two metre counterpart.

For more information, contact your local authorised Icom dealer or Icom Australia, 7 Duke Street, Windsor, Vic. 3161, phone (03) 51 2284.

GOOD THINGS DO COME IN SMALL PACKAGES

In today's world of high technology marine transceivers, small is beautiful. And Icom, with decades of experience in the manufacture of state-of-the-art mobile, portable and marine transceivers, leads the field in compact transceiver design.

A shining example of this is the new Icom IC-M55, an ultra-compact, go anywhere marine transceiver that is incredibly small, but packed with high technology features.

Measuring only 5.25, 1.75 and 6 inches (140 x 50.5 x 163 mm VHDD), smaller than most SATNAV receivers, and weighing only 1.3 kg, the IC-M55 can be mounted almost anywhere for convenient and easy access.

The IC-M55 compact marine transceiver covers the 78 international VHF marine channels and can be programmed for almost any authorised VHF marine channels. The 10 instant access memory channels can be used to store your most used marine frequencies.

A priority monitoring function lets you keep a listening watch on the emergency or your favourite communications frequency, even during a contact on another channel.

The fully synthesised IC-M55 can scan for signals on the 10 programmed memory channels or across the entire range of user-specified VHF marine channels.

A large, bright LCD readout makes it easy to read the display even in direct sunlight. A display dimmer switch lets you adjust the brightness of the display to suit your own preference.

A full 25 watts of output power makes the IC-M55 one of the most powerful VHF marine transceivers, for its size, on the market today. For close quarters operation, a one watt selectable low power output can be used.



With three watts of crisp, clean audio output from its internal speaker, or five watts from an external speaker, you will not miss anything, even in the worst weather conditions.

The rugged, die-cast aluminium chassis and plastic mylar moisture resistant speaker can take a lot of punishment. The IC-M55 is built to last.

See the IC-M55 at your nearest authorised Icom Dealer or contact Icom Australia, 7 Duke Street, Windsor, 3161, phone (03) 529 7582.

BROADCAST STATION GUIDE

A new edition of the Department of Communication's guide to radio and television stations is now available.

The guide lists all the broadcasting services within Australia to September 1986, with their respective call signs, frequency, radiated power and site details.

The book titled, *Radio and Television Broadcasting Stations* is a valuable reference source for broadcasters, students of communications, and the general public.

It is available from Australian Government Bookshops for \$14.95 each.

PACKET RADIO

The Sydney Amateur Digital Communications Group wishes to announce the release of SADC Digital Repeater (DR) software, version 2.3, which

Radio Handbook

Twenty-Third Edition

William I. Orr, W6AL



A MUST FOR THE AMATEUR SHACK

The latest edition of the legendary *Radio Handbook* by William Orr has just been released.

Completely revised and updated, this edition contains new material reflecting the latest technology on everything from HF-VHF amplifier design to interference for VCRs and video disc players.

Circuit diagrams, photographs, construction diagrams, tables and charts are all included for expert guidance and instant reference.

Topics include:

- Introduction to Amateur Radio Communications
- Communication Receiver Fundamentals
- Frequency Modulation and Repeaters
- Mobile, Portable and Marine Equipment
- Radio and Television Interference
- Equipment Design, Components and Controls
- VHF and UHF Antennas
- Transmission Lines and Matching Systems

William Orr obtained his amateur radio license in 1934. He is the author of many books, has written over 100 technical articles, and has been editor of the *Radio Handbook* since 1955. His handbooks have won world-wide popularity.

Howard W Sams and Company, a division of Macmillan Inc, is a leading technical publisher of electronic, computer and engineering books. Sams and Hayden books are distributed in Australia by Pitman Publishing.

For further information please contact Sue Bunday at Pitman on (03) 699 5400.

The *Radio Handbook*—RRP \$75.00.

FIRST REAL POCKET PORTABLE

If it were any smaller, you would have trouble keeping sight of it! That is the new IC-u2A (micro-2) from Icom. The first true pocket-sized two metre portable amateur radio transceiver — a tiny package with all the features that have made Icom hand-held transceivers famous.

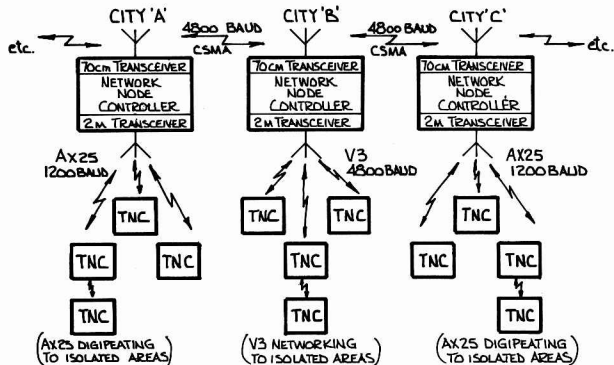


Figure 1: An example of a Packet Network for Australia.

is a result of the new DOC regulations announcement in November 1986, relating to the phasing out of Vancouver V2 protocol.

To meet the new regulations, there has been a release of Vancouver V3 protocol (which meets the DOC requirements) and a phasing out of Vancouver V2 protocol. It was decided to upgrade the SADCGR DR to cater for Vancouver V3, plus provide functions to AX25 users, that were available to Vancouver V2 users, (refer to January issue of AR) except for those functions which do not apply to AX25.

The following functions are now available to AX25 users:

HELP lists the available commands to the users.
TIME gives the current time, along with DR identification and location.
STATUS gives status report of DR including error log.
CLEAR clears the Common Communications Area (CCA) of the DR.
SAVE saves the previous channel activity into the CCA.
DUMP displays CCA of DR in both Hex and ASCII format.

There are also control station commands, some of these are:

MSG loads a short message, which is tagged to the DR time/ID frame.
TRAP allows the control station to run a trace in the DR, used in remote diagnosis of DR problems, should they occur.

Of course, this software is only available to amateur radio groups, who are operating or planning a licensed Digital (Packet) Repeater and is presently only available for the VADCG TNC+.

The Hamilton Area Packet Network (HAPN), in Canada, have recently announced their 4800 Baud radio modem, for use in amateur packet

radio. This revolutionary modem allows packets to be passed at 4800 Baud through a standard VHF/UHF transceiver.

The modem uses FSK techniques and can operate at higher speeds using transceivers modified for wide bandwidth, but for the application of providing cost effective network links in Australia, 4800 Baud, half duplex links, will be a starting point.

Two of these modems were obtained by the SADCGR, in Sydney, for evaluation and have proved to be successful, operating on two metres, using both Vancouver and AX25 protocols.

The HAPN 4800 Baud modem PCBs are priced at Can\$25 each, plus Can\$3 p&p, and orders of three or more are Can\$20 plus Can\$3 p&p. They can be ordered by sending money orders to HAPN, Box 4466, Station D, Hamilton, Ontario, Canada, L8V 4S7.

Parts for the modem are readily available in Australia and total building cost is around \$50, and it provides RS232 connection, plus prototyping area.

The HAPN modem could play a significant role in the implementation of an amateur packet network for Australia, because, to provide a cost-effective network, we will have to use Network Nodes that are linked to each other, by a common mode; eg 70 cm, half duplex, CSMA (Carrier Sense Multiple Access), with the highest possible Baud rate through a standard transceiver and, at present, the only modem, at an affordable price, is the HAPN one.

No doubt in years to come, there will be higher speed modems and wide bandwidth UHF/Microwave transceivers that will be available, probably on the commercial surplus market, but for the interim, 4800 Baud on a 70 cm simplex channel maybe the only financially practical alternative for an Australian network.

Figure 1 shows an example of how such a network might exist.

—Contributed by Steven Blanche VK2KJF, Secretary, SADCGR

1987 ARRL BOOKS



NOW AVAILABLE FROM YOUR
DIVISIONAL BOOKSHOP



Australian Ladies Amateur Radio Association

Joy Collis VK2EBX
PUBLICITY OFFICER, ALARA
Box 22, Yeoval, NSW 2868



Education Notes

Brenda Edmonds VK3KT
FEDERAL EDUCATION OFFICER
PO Box 883, Frankston, Vic. 3199

JAPANESE BY RADIO

Surely amateur radio must be the only pastime that lends itself to so many variations and "sub-hobbies," communication being the theme that draws it all together.

One ALARA member has found a unique way of utilising her hobby of amateur radio to learn Japanese.

Joan Beevers VK3BJB, of Mildura, first started learning the Japanese language nearly three years ago, her teacher being Hishasi Watanabe JI2MPX/MM, and more recently, Mitsuhiko Motoo JE6AAQ, who is teaching her some new vocabulary every day, "so I don't forget" as Joan says.

Joan's Japanese lessons have been rewarding in many ways, one of them being the Japanese friends she has made along the way, notably Kyoko Yoshikawa JH6OCT, and her husband Nobuo JH6OCS, who visited Joan while on a fortnight's holiday in Australia. Joan was able to assist with their travel arrangements, and make their holiday an enjoyable experience, even though Kyoko's English is very limited.

In mid-December 1986, the Beevers travelled to Portland to meet Motoyuki Miyata JG6XLF/MM, when his vessel arrived to load wood chips. When it was discovered that the Captain, Koki Suzuki, was also an amateur radio operator (JR4SST/MM), the scheduled two-hour meeting turned into a six-and-a-half hour visit, with the Beevers being taken on an inspection of the vessel as the Captain's guests. Motoyuki speaks little English, but Joan's knowledge of the Japanese language enabled her to converse with him satisfactorily, and language proved no barrier.

Another important use was found for Joan's Japanese skills when she was asked by Captain Yoshinori Sasada JR5ACC/MM, to assist with marine mobile radio communications, especially relaying weather reports, position, etc, from yachts travelling from Japan for the Melbourne to Osaka Yacht Race, held in March. Captain Sasada has taught Joan the nautical and weather terms used by Japanese operators, as most of them speak no English.

Joan is the only Australian amateur radio operator who has been invited to help the controller of the Akera Net used by Japanese amateur radio operators on board leisure or competitive yachts.

Joan has been licenced for 18 years, and has hosted amateur radio friends from many countries, including America, Japan, South Africa, West Germany and England.

When Japanese exchange student, Shinya Itoi JG2RHT, studied at Merbein High School he was able to contact his father, Teruyuki JG2OTF, every week from Joan's QTH, and after he returned to Japan Joan and Teruyuki continued the weekly schud to keep in touch.

Joan says: "As you can see I keep very busy. It keeps the brain active I can tell you, and makes a nice change from the housework!"

Congratulations, Joan, on a very worthwhile achievement.

TRAVELLING IN THE OUTBACK

Bonnie VK3PBL, will be involved in an adventurous trip up the Canning Stock Route, in Western Australia, which runs approximately 2000 kilometres from south-west to north-east, across the Gibson and Great Sandy Deserts.

Five four-wheel-drive vehicles will be used, and the party, consisting of 10 people and one dog, hope to leave this month and anticipate taking three to four weeks to do the trip from Wiluna to Hall's Creek.

They hope to check into the Travellers' Net each day, and also contact Melbourne when possible.

ALARA GET-TOGETHER

Plans are well under way for the second ALARA Get-Together (details March AR). The OMs are welcome to come along too (I think we would be a little upset if they didn't!).

The last get-together was a very enjoyable occasion for all concerned, and we are looking forward to the next one.

I might be as advisable to arm oneself with a plentiful supply of throat lozenges, though, to ward off the effects of laryngitis caused by too much talking! One of the "side-effects" of get-togethers.

Inquiries and registrations to Maria McLeod VK5BMT, 1 Hawkins Avenue, Flinders Park, SA, 5025.

Until next month, 7/3/83, Joy.

LOCUS ~ TECHNICAL

SERVICE & REPAIR SPECIALISTS

EXPERT PERSONAL SERVICE
AT VERY REASONABLE RATES

CALL JOHN (JAK) MELIA
VK3QD

RADIO TECHNICAL OFFICER

TEL: (03) 751 1231



Licensed Secondhand Dealer

Also available:

- TRS 80C SOFTWARE
- LOCtec RTTY/CW MODEM

LOT 7, RIDGE ROAD,
MOUNT DANDENONG, Vic. 3767

MAIL ORDERS TO:

C/- OLINDA PO, OLINDA, VIC.
3788.

Very many thanks to all those who have offered comment or ideas to the debate about the future of the examination system. I am sorry that I have not had time to reply personally to the many contributors.

A very pleasing response was received, and all comments were noted. A summary of the responses will be published next month, and the range of proposals will be debated at the Federal Convention. Further items arising from this discussion will be published at a later date.

DOC has agreed not to take any further steps until after the Convention, at which Departmental officers will be present.

The debate surrounding the DOC examination devolution proposal has again emphasised the range of points of view held by members. As with the arguments raised for and against the introduction of the Novice Licence, and the legalisation of Citizen Band, the opinions expressed by the more vocal, and often more biased, members tend to drown out the quietly presented, reasoned approaches.

This is not necessarily a situation which must be decided by majority vote here and now. We are looking at a major change to the amateur system, as big as those mentioned above. It is going to affect all new recruits to the hobby in a very short time. It will quite likely mean an increased workload for a number of members, and a financial commitment from the Institute. We must consider our capabilities both in the short term and over a period of years or decades.

So the voices which must carry most weight in the decision making are those emanating from the members who have the vision to plan a structure which can cater for both present and future needs, and who are prepared to put some effort into the building of such a structure.

We do not intend to stifle or ignore the "They ought to ..." and "Why don't they ???", but, please, let us know at least an equal and preferably an overwhelming response of "I will do ...". We can ... and "Let us try ...".

My best wishes to those sitting for the May examinations. Remember, **READ THE QUESTION** — and ALL the answers, and I look forward to working you on air in the near future.

—73, Brenda VK3KT

FREQUENCY HOPPING

THE AUSTRALIAN ARMY is field-testing prototypes of a frequency-hopping combat radio.

Australia and the United States are the only countries in the world at present introducing a sophisticated, jamming-resistant radio system which also has the advantage of being difficult to locate.

The VHF radios are produced by Plessey Pacific Defence Systems Pty Ltd, and are part of a communications system project known as RAVEN.

Total cost of the system is expected to be more than \$300 million once approval to proceed with full-scale manufacture is given later this year.



Shirley Wd8MEV.



VK2 Mini-Bulletin

Tim Mills VK2ZTM
VK2 MINI BULLETIN EDITOR
Box 1066, Parramatta, NSW 2150

30TH ANNIVERSARY OF VK2WI — DURAL

Permission was granted to the WIA in 1939 to conduct a weekly broadcast for those members unable to attend the regular meetings. Unfortunately, WWII intervened.

After the War, the VK2WI Broadcasts were conducted from the Eastlakes Chemist Shop of the late Jim Corbin VK2YC. There was a move in the early 50s to find a "Home for VK2WI." The present site was located on the (then) rural outskirts of Sydney and work commenced in 1963.

The official opening was performed on May 15, 1967, by the Hon Allen Fairhall MHR, VK2KB, who was Minister for the Interior.

The Council plans to celebrate the anniversary with a function at Dural. Final details will be given on the Broadcast leading up to the day. Part of the lead-up has been the conducting of a weekly quiz via the Broadcasts. The last day of questions will be May 10, and answers must reach the Divisional Office by Friday, May 15.

The anniversary celebrations will be on Saturday, May 16, afternoon and evening.

The Saturday afternoon at Dural will be a series of fox hunts and field events. The evening will be devoted to the Annual Dural Fireworks Display. On Sunday, VK2WI will be operated as part of ITU Day.

OXLEY REGION FIELD DAY

Further details of this event may be found in the *Club Corner* notes. The Field Day will be conducted as usual by the Oxley Region Amateur Radio Club at Port Macquarie over the June holiday weekend — Saturday and Sunday, June 6 and 7. As a prelude to this event, a quiz with the answers being given on the VK2WI Broadcasts on May 17, 24 and 31, is being conducted. Further details may be obtained by writing to the Secretary, Oxley Region ARC, PO Box 712, Port Macquarie, NSW, 2444.

VK2QBK MUSEUM STATION TO CLOSE

After some eight years of providing a display of amateur radio to the public, the Museum authorities have decided not to transfer the station to the next stage of the Power House Museum.

The display was first established in the original museum when it was in Harris Street. Then, when Stage One of the Power House Museum was established — VK2QBK — was redesigned and installed on the mezzanine floor of the display area. It was constructed in such a way that it could be relocated to another venue, this was to be the next section of the museum, but changes in concept and planning altered this approach. The facility is now to be dismantled and stored, pending investigation of alternative venues under the control of the museum. If anyone has any thoughts of a suitable venue, would you convey this to the Divisional Council.

DIVISIONAL COUNCIL

At the close of nominations on February 25, five nominations had been received for the seven vacancies on the Council for the year 1987-88. The incoming Council has had to seek personnel to fill these vacancies. This is also the time of the year for the various sub-committees to have an input of new and additional personnel. If you can assist the Division carry out the many tasks, would you contact the Office with your offer.

CALL BOOK ENTRIES

It is again approaching that time of year to submit any corrections for this year's edition. The entries for Institute members, if not otherwise advised to the Editor, is the same as that for the address label of AR. In the case of non-members, the details are those the Department has on their files. An entry which is currently incorrect will remain that way until new information is forthcoming. Some changes of details which have been submitted to

the Department do not appear to have been included in the update lists supplied by the Department for the Call Book. The introduction last year of the *SMIS* system to Department record-keeping should overcome these problems in the future. However, it will not correct any currently wrong entry.

When submitting any changes of details to the Department, it would help the Call Book Editor if a copy of the changes were made available to him. This can be done by sending it direct to PO Box 300, Caulfield South, Vic. 3162, or to the VK2 Divisional Office at the address at the top of this column. (Please submit alterations in writing).

TELEPHONE NEWS (02) 651 1489

This Divisional service appears to be settling in well. Should you find that you have missed either of the Sunday Broadcasts at 11 am or 7.30 pm, then call — out of broadcast hours — (02) 651 1489, for a summary of the weeks news.

NEW MEMBERS

A warm welcome is extended to these new members who were in the March applications.

K J Cavanagh VK2CAO
I K Dunlop VK2AVS
R F Hammond Assoc
B K Harrison Assoc
P Oger VK2NOK
W J Perry VK2XWP
B Bewick VK2JLJ
T B Sampson VK2TMB
P B Thompson VK2MAN
Gosford
Murrumbidgee
Coogee
Carlingford
Kingsford
Werris Creek
Fairy Meadow
Tamworth
Kempsey

REPEATER NEWS

During the past year there has been much activity with VK2 systems. The level of pager interference has become worse, making it more difficult for systems above 147 MHz.

Liverpool RLD on 7375 is expected to change to 6625; ROT on 7075 at Paddington has a pager intermodulation signal on its input; Nowra RSD on 7200 is also reported to be suffering.

Central Coast is developing an ATV 70/50 repeater and packet on 7600; Summerland is adding RBB 7200 at Byron Bay; Tumut have been licensed on 6800 with RTD; Wagga have added 8675 to RTW; Hornsby is to change packet from 7575 to 4900; NSW WICEN may establish packet on 4650 in the Blue Mountains; Blue Mountains RBM 7050 may relocate; Gladstone are to relocate RGR 6925, RRS 8475 and RTV 50 cm ATV to a Chatswood location.

Westlakes is not proceeding with a RTTY system RPI on 6625; RTZ on 7100 is to relocate towards Scone in the Hunter Valley and to be replaced in the Newcastle region with (RWL) on 6775.

Oxley Region is adding 8525 and packet 7575 to RPM; Taree has indicated interest in establishing a service on two to cover the gap between Newcastle and Oxley (RPM); Newcastle UHF and ATV are to establish six metre RSN on 3625; RWI has been licensed for 3850, which is currently being constructed. The Division is also looking into establishing a packet bulletin board.

VKI recently conducted packet tests on 7575 from Mount Ginini. License applications are pending for Coffs Harbour RCH, and Wollongong RAW, on 7575. Packet is a new mode from a repeater point of view and these systems are subject to change and/or relocation.

Broken Hill is currently developing a beacon — RBH — the channel is yet to be determined. WICEN RWS have installed a new 10 watt diplexed repeater on 7150 Chatswood, which replaces the original separate antenna system. The Chatswood sky-line is becoming congested with new high-rise (which means the lift on the outside of the BMA Building is losing some of its view). This may limit some of the WICEN coverage, but when current development is completed in a couple of years it will be time to determine the

extent of the shadows. There is also some pager intermodulation to the system.

VK2 has about 60, or one-quarter of the country's repeater systems, so there is always some changes going on.

Just a closing note to the various repeater groups. By now you should have received FTAC information sheets to update the records for the data bank, as well as the next edition of the Call Book. Would you ensure that these are returned as soon as possible to the Federal Office, PO Box 300, Caulfield South, Vic. 3162.

30TH ANNIVERSARY OF VK2WI

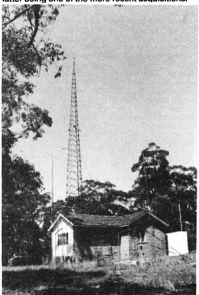
On May 15, 1967, Sir Allen Fairhall VK2KB, officially opened the transmitting station of the NSW Division, VK2WI. This month we celebrate the 30th anniversary of the event.

VK2WI is located at the top of a ridge at Dural, some 25 km north-west of Sydney, and is the originating station for the NSW Division's Sunday Broadcasts. The station also houses the Division's beacons (VK2RSY) and repeaters (VK2RWI). The five acre bushland site is also used for a variety of activities, including the monthly barbeque and annual fireworks display.

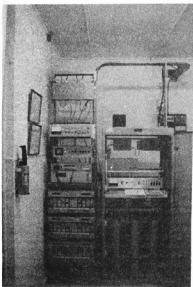
Over its 30 year history, the station has been refitted on several occasions, the most recent being the re-establishment of the broadcast facilities over the period 1978 to 1982. The station now broadcasts on 10 different frequencies in the 160 metre to 70 centimetre bands with a wide variety of equipment, some of commercial origin and some custom-made.

On 1.845, 3.595 and 7.146 MHz, the primary transmitters are AWA J54800s, each producing 500 watts of AM. These transmitters use a pair of 810s in the final, modulated by another pair of 810s, and have recently been upgraded with the fitting of solid-state sub-modulator units. The AM broadcasts on these bands continue to be popular in spite of the fact that SSB is now universally used for phone operation.

As backup for the AM transmitters, and for taking the call-backs following the broadcasts, there is a Collins 32-RS-1 fixed channel SSB transceiver and a Yaesu FT-107 transceiver, the latter being one of the more recent acquisitions.



The VK2WI Building.



The Repeaters and Links.

The SSB transmission on 28.320 MHz is provided by a converted CB base station transceiver driving a 60 watt solid-state linear amplifier. This transmission provides good coverage of the Sydney region, and is intended particularly for Novice listeners.

On the VHF bands, a home-brew dual band crystal locked transceiver provides SSB transmissions on 52.120 and 144.120 MHz. This unit produces 20 watts PEP on six metres and 10 watts PEP on two metres from a common 9 MHz exciter.

There is also an FM transmission on 52.525 MHz, using an AWA BSS0 transceiver. This is the oldest piece of equipment currently in service at VK2RWI, and will be pensioned-off as soon as the six metre repeater is established.

On two-metres, a KDK FM transceiver is used to provide a broadcast link to repeaters in the Illawarra, Central Coast, Lake Macquarie (Newcastle) and Western Blue Mountains regions, and can also be used as a general purpose transceiver outside broadcast times.

The repeaters on 147 and 438.525 MHz share more than just the VK2RWI call sign. Both are controlled by a homebrew Z80 microprocessor based controller, which looks after both repeaters on a time-sharing basis. This controller provides all timing and identification functions, as well as continuous status monitoring and fault reporting. Remote control and telemetry facilities are also included. Details on the operation of these repeaters is given elsewhere in this issue.

The two metre repeater is fully home-brew, producing about 40 watts output from a B40-12 transistor in the final. A six cavity duplexer provides the necessary 100 dB or so of isolation between the transmitter and receiver, as well as protecting the receiver from the powerful Telecom paging transmitters located just 500 metres from the station.

The 70 cm repeater uses the transmitter from an AWA 15M transceiver, and the receiver from a Philips Westminster transceiver, neatly packaged into a small rack-mounting box. The transmitter and receiver are combined in a four cavity duplexer.

The repeaters also share a common power supply, which is fitted with 90 Ah of battery backup. The batteries are capable of running the repeaters for several days in the absence of mains power.

The station also houses the Sydney beacons, VK2RSY on 28.262, 52.420, 144.420, 432.420 and 1296.420 MHz. The 10 metre beacon uses on/off

keying of the carrier and is vertically polarised, while the remaining beacons use frequency shift keying and are horizontally polarised. The beacons serve two purposes. For distant stations, they provide an indication of possible band openings or other unusual propagation, while for local stations they provide a constant reference signal for receiver or antenna adjustment. Reception reports have been received from all over the world, and are always welcome.

Since the beacons share their antennas with the broadcast transmitters on 10, 6 and 2 metres, it is necessary to turn these beacons off during broadcast times, namely 1045 to 1215 and 1945 to 2045 local time on Sundays. The 70 cm and 23 cm beacons operate continuously.

At the heart of the station are the two operator's consoles located in the studio. These consoles allow independent operation of up to 16 transmitters and receivers, under the control of a 2650 microprocessor. During the broadcasts the consoles are linked, with audio from the announcer's console being routed through the engineering console, giving the engineer full control of the station. For call-backs, the consoles are operated independently, allowing two groups of call-backs to be taken simultaneously.

To radiate all of this RF, the station needs several antennas. Three 20 metre tall wooden poles support the 80 and 40 metre dipoles, the 160 metre inverted Vee and the 10 metre halfwave vertical. The VHF and UHF antennas are spread over two self-supporting towers. On the smaller of



The Beacons.

the towers are the six and two metre and 70 centimetre beacons antennas, while the larger tower supports the 70 centimetre repeater antenna, the 23 centimetre beacon antenna, the two metre repeater antenna, the six metre FM antenna and various link antennas.

Looking to the future, we are currently developing a six metre repeater in conjunction with WICEN. One of the difficulties being encountered is providing sufficient isolation between the transmitter and receiver at this low frequency, and this is further complicated by having to also isolate the receiver from the six metre beacon. It may well prove to be impractical to operate the transmitter and receiver from the same site, and a split site system is being considered, at least as an interim solution to the problem.

Other projects being considered include solid-state replacements for the J54800 transmitters, using modern switch-mode techniques. Such a replacement will be necessary when our supply of

spare parts, particularly 810s, for the J54800s dries up.

Additional beacons for the microwave bands are also being planned as long term projects, and modifications will be required to the 10 metre beacon in order to fit in with the change to time-sharing beacons on this band, due to be fully implemented by the end of the decade.

Visitors are welcome to inspect the station on Sunday mornings between 10.30 am and 12 noon, and, in particular, on the first Sunday of the month when the barbeque is held.

DURAL REPEATERS

The Wireless Institute of Australia, NSW Division operates repeaters in the two metre and 70 centimetre bands from its Dural site, under the call sign VK2RWI. Following is a description of the operation of these repeaters.

GENERAL INFORMATION	TWO-METRE	70 CENTIMETRE
Output frequency	147.000 MHz	438.525 MHz
Input frequency	146.400 MHz	433.525 MHz
Output power	40 watts	10 watts
Antenna gain	10 dBi	8 dBi
Antenna pattern	Cardioid (max south)	Omni

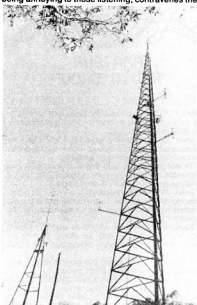
Control Functions

Both repeaters are controlled by a central microprocessor and operate as follows:

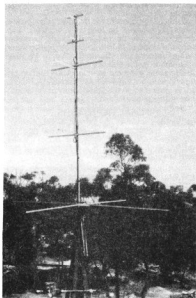
TAIL — normally 0.6 seconds, but extended to 1.2 seconds on weak signals.

TIMEOUT — 3.5 minutes. Timeout is indicated by a 1 kHz tone transmitted for one second. This tone, preceded by an identification, is sent every two minutes while the repeater is timed out. When the incoming transmission ceases, the repeater sends a "raspberry" followed by an identification. Note that the timer resets at the end of the tail, so allow the repeater to drop out fully between overs. Timeout is inhibited automatically at broadcast times, and may also be manually inhibited at other times, and this mode is indicated by a short 1 kHz tone burst at the end of the tail. Timeout is reduced to 20 seconds when the battery voltage is low.

ANTI-BUTTON-PUSH — all incoming transmissions are checked for modulation content. After four transmissions lacking suitable modulation the repeater shuts down. This is reset on receipt of a suitably modulated transmission — the recommended procedure is to announce your call sign. Note that button-pushing, as well as being annoying to those listening, contravenes the



The Towers.

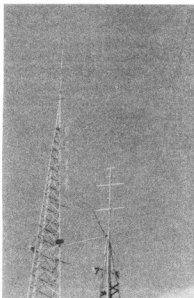


Beacon Antennas.

regulations relating to identification of transmissions, ie don't.
OFF-FREQUENCY INDICATOR — transmissions more than 2 kHz off frequency receive a tone during the tail — a high tone (1.6 kHz) meaning high in frequency and a low tone (600 Hz) meaning low in frequency. This function is disabled when timeout inhibit mode is activated, as a result of abuse during broadcast call backs.
LOW POWER (2m only) — when switched to low power mode (10 watts), the call sign is sent using 600 Hz instead of the normal 1 kHz tone.
FAULTS — the performance of the repeaters is continually monitored and abnormal operation of the power supply or transmitter is indicated by a "B" (for battery) or "F" (for fault) respectively being sent at 80 second intervals. The pitch of the tone used indicates the nature of the condition as follows:

	600 Hz	1 kHz	1.6 kHz
POWER SUPPLY ("B")	Low voltage	Mains failure	Battery charging
TRANSMITTER ("F")	Low output	High transmitter current	High SWR

MAINTENANCE — these repeaters are maintained by the WIA Dural Committee, and extensive remote control and telemetry facilities have been provided for this purpose. Note that maintenance and testing operations have priority over normal use (other than emergency traffic). Routine maintenance includes battery cycling several times each year.



Beacon and Repeater Antennas.

CLUB PORTRAIT

Jim Linton VK3PC

4 Ansett Crescent, Forest Hill, Vic. 3131

LAND FORCES



AMATEUR RADIO GROUP

LAND FORCES AMATEUR RADIO GROUP

Forces (CMF), Territorial (TA), National Service or any other type of army service.

"The aim is to foster fellowship among members and ex-members of the Land Forces of any country — to promote discussion of mutual interest.

"Our group is open to anyone, it doesn't matter whether he or she was in enemy armies."

The LFARG is truly reflecting the hobby, amateur radio, which transcends all national boundaries, religions, race, colour, creed and political ideologies.

It deserves to grow, and has a keen committee hoping to attract the vast number of potential members.

During the LFARG weekly nets on Wednesday's at 1000 UTC, on 3.595 MHz, a discussion with a military flavour is held.

The topic is announced a month or so in advance to allow members time to borrow books from their local library and read up on the matter to be discussed.

To allow Novices to participate in the net, 80 metres was deliberately chosen.

The LFARG net, with its lively discussion on the military, is well worth a "sandbag" listen.

The group is seeking Incorporation in the ACT, plans to issue a regular newsletter, and members receive a numbered membership certificate.

Crossed swords and a world globe feature on the group's logo which is published for the first time at the head of this Club Portrait.

Readers interested in the group and seeking more information may write to LFARG Secretary, Sam Galea VK2AKP, "Hadidu", 57 Fairview Road, Canley Vale, NSW. 2166, or join the weekly net.

BUY NOW AT REASONABLE PRICES

GUYS & GALS WIA LOGO WEAR

T-SHIRTS, LEISURE SHIRTS & WINDBREAKERS

AVAILABLE IN SIZES 12-24 FROM



YOUR DIVISIONAL BOOKSHOP

The LFARG was formed on January 29, 1986, to fill an eligibility gap evident in other groups for ex-service personnel.

Sam Galea VK2AKP says for some years he considered forming a group which all ex-soldier and soldiers could join for friendship.

To test the waters and see if anyone else was interested in forming such a group, he put a notification in *Amateur Radio* magazine.

John VK1NCO, (President), Vic VK3CQP (Vice-President) agreed with Sam's thinking and the trio worked together setting the foundations for the group.

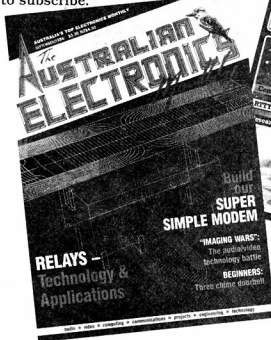
Sam says: "There's Air Force and navy amateur radio societies, and an Army society for people who served or were associated with signal regiments.

"I thought 'what about the poor soldiers' who are excluded from these other groups."

To be eligible for LFARG membership, a radio amateur, or SWL, must have served in an Army unit and had a regimental number allocated. Sam explains it does not matter whether a person served in a Regular, Reserve, Citizen Military

Now there are more reasons to subscribe!

With Australian Electronics Monthly now incorporating Elektor Electronics — there are more reasons to subscribe.



- More projects!
- More features!
- More practical articles!

With Elektor inside AEM, now you get more scope and variety in articles, features and do-it-yourself projects. This means — you should not miss a single issue! To avoid disappointment, make sure you get every issue — **SUBSCRIBE!**

It's cheaper to subscribe! Rather than pay \$57.00 for an annual subscription (\$4.75 a month), you can subscribe at \$49.95!

Australian Electronics Monthly is edited by Roger Harrison VK2ZTB and published by Kedhorn Holdings, Fox Valley Centre, Cnr Fox Valley Rd & Kiggle St, Wahroonga 2076 NSW.

And what's more, you could win yourself a great Weller soldering station!

Fill out the coupon and send it today.

SUBSCRIPTION FORM

Subscribe, and you could win this superb Weller WTCPN Soldering Station courtesy of Cooper Tools. Each month, we'll award this prize — worth over \$140! — to the new subscriber who best answers the questions here.

Q1: Weller irons employ "....." point temperature control.

Q2: On a separate sheet of paper, in 30 words or less, what was it that prompted you to subscribe to AEM this month?

Annual subscription price: ~~\$57.00~~ \$49.95!
(overseas prices on application).

Complete this coupon, cutout or photostat and send to:

Subscriptions Dept.

Australian Electronics Monthly
PO Box 289, WAHROONGA 2076

Please forward 12 issues of Australian Electronics Monthly

Please tick payment method:

Bankcard ☐ Visa ☐ Mastercard ☐
American Express ☐ Cheque/money order ☐

(Please make cheques or money orders payable to Australian Electronics Monthly)



THE PRIZE

A transformer powered soldering station, complete with a low voltage, temperature-controlled soldering pencil. The special Weller "closed loop" method of controlling maximum tip temperature is employed. This helps protect temperature sensitive components, while the grounded tip and non-inductive heater protects voltage and current sensitive components. The soldering pencil features stainless steel heater construction, a non-burning silicon rubber cord and a large selection of multipoint tips in sizes from 3 mm diameter to 6 mm diameter with a choice of tip temperatures of 335°C/600°F, 370°C/700°F and 400°C/750°F. The transformer case features a unique 3-prong cord for durability, and protects against accidental damage. A spark arrester/circuit breaker plug for the soldering iron, a vinyl large wiping sponge, tip tins to store extra tips, plus an improved all-in-one switch with a long life seven indicator light, a non-heat sinking with ring screw holder, and a 2 in flexible 3-way cord.

Card No.

Expiry date

Signature

Name

Address

Postcode

*Unsigned credit card orders cannot be accepted.

Electronics Today

ONLY
\$2.95
NZ\$3.95

Electronics Today is Australia's dynamic electronics monthly. It has more special features, new and exciting projects to build and a wealth of information on components, equipment and new technology. Regular features include Australia's top hi-fi reviews and news on communications and computing. Buy your copy now from your local newswagent, or become a subscriber and have the magazine home delivered. Only \$35.40 for 12 issues.

Send your cheque to:
Subscriptions Department
Federal Publishing
P.O. Box 227
Waterloo, N.S.W. 2017
Federal Publishing Company,
140 Joynton Avenue,
Waterloo, NSW. 2017.
PH: (02) 663 9999

WINTER PRICES SLASHED

IN G.FS's "YOU'RE THE WINNER SALE"

THESE ROCK BOTTOM SALE PRICES ARE FOR MAY ONLY OR UNTIL STOCKS ARE GONE

MFJ PRICES TUMBLE

MFJ-949C Crossed Needle Malcher	was \$354 5439
MFJ-941D Versa Tuner Plus	was \$485 5299
MFJ-901B Basic Tuner & Balun	was \$287 5199
MFJ-959 SWL Active Tuner	was \$347 5289
MFJ-1701 6 Position Coax Switch	was \$154 5124
MFJ-202B Wide Range Noise Bridge	was \$285 5199
MFJ-213 VHF Converter for 2m Handys	was \$395 589
MFJ-1437 RF TV Modulator for ATVs	was \$295 599
MFJ-1224 RTTY/Computer Interface	was \$485 5349
MFJ-1270 TNC-2 Packet Controller	was \$685 5645
MFJ-250 2 kW Oil Filled Dummy Load	was \$199 5159
MFJ-871 Bench Key Paddle	was \$245 5199
MFJ-1500 Hi Fi Audio Enhancer	was \$280 589
MFJ-1901 Stereo Synthesizer	was \$289 5149

REDUCED ANTENNA PRICES

OSCAR-2ND 2m 5/8 Gutter Mount	was \$145 599
HS-VK5 HF Self-Supported Trapper Vert	was \$284 5479
Ringo, 2m 9 dBi gain base Antenna	was \$140 5134
70 cm Swiss Quads, 15 dBd Gain	was \$395 599
5m Swiss Quads, 12 dBd Gain	was \$255 5149
20m Swiss Quads, 10 dBd Gain	was \$390 5199
1296 MHz 17 Section High Gain Collinear	was \$329 5199
A-2430 30/40/20m 60 ft Trapped Dipole	was \$295 5185
0hm 75 High Performance Mobile Helical	was \$260 589
40, 20, 15, 11, 10m 6 ft Mobile Helical Ants	were \$240 549

* NOTE: Please add \$18 to cover post & packing to any of the items shown above unless otherwise indicated.

WE ALSO STOCK

- A range of publications including: Australian Call Book \$6.95 + \$4 p&p; Guide to Utility Stations, over 45 pages of HF Utility Freqs & Schedules \$49 + \$8 p&p; Radioteletype Press Broadcast Freq/Time List \$25 + \$4 p&p; Embassy Radio Comms Freq List \$33 + \$4 p&p.
- EMULATOR ROTATORS
 - Model 110MSAX Top Line Rotator was \$1295 9999
 - Model 502SAX Heavy Duty Rotator was \$348 5749
 - Model 105TSX Medium Duty Rotator was \$285 5599
 - Model 1211 Mast Clamp for 105TSX was \$278 559
 - Model 1213 Mast Clamp for 502SAX was \$134 589
 - Model 215 Mast Clamp for 110MSAX was \$147 5109
- DEGLASS NON-CONDUCTING BOTS
- FB SERIES LOW LOSS COAXIAL CABLES
- AR-2002 & SX-155 PROGRAMMABLE SCANNERS

SPECIAL (at vert limited quantities)

HS-FB Heavy Duty Tow Bar Antenna Mount	was \$124 589
RX-2300 2300 MHz Converter Kit, Only 2	was \$340 5159
MDK-17 RTTY/CW Modern Kits, Only 2	was \$395 5129
Worldspan Shortwave Converter for Scanners	was \$340 539
EJC Corrosion Inhibiting Compound for Antennas	was \$20 517
Great Circle Maps centred on Melbourne	was \$5 \$2 + \$3 p&p
LP-30 Low Pass Filter, High Quality	was \$89 579
HP-30/UB 75 ohm High Pass Filter	was \$49 545

* TRADE prices are not available on any items shown here.



AUSTRALIAN DISTRIBUTOR

GFS ELECTRONIC IMPORTS

Division of Deribar Pty. Ltd.

17 McKeon Road, Mitcham, Vic. 3132
PO Box 97, Mitcham, Vic. 3132
Telex: AA 38053 GFS
Phone: (03) 873 3777 3 Lines



VK3 WIA Notes

Jim Linton VK3PC
IMMEDIATE PAST-PRESIDENT
WIA VICTORIAN DIVISION
412 Brunswick Street, Fitzroy, Vic. 3065

ANNUAL GENERAL MEETING

The WIA Victorian Division AGM will be held at the Divisional Headquarters, on Wednesday, May 13, starting at 8 pm.

Apart from the formal corporate matters and requirements under the Articles of Association, as advised in an insert in AR last March, the AGM gives members an opportunity to question officials, hear the WIA's activities and policies, or to raise any matter of concern.

The Victorian Divisional Council for 1986-87 has made important decisions related to the Division's overall financial management.

It has issued a policy statement on the Inwards QSL Bureau, and an Interim Policy on the proposed development of examinations by the Department of Communications (both published in full in the VK3 Notes last month).

The year has been a busy one for Council, which I am sure the retiring President, Alan Noble VK3BHM, will outline in his Annual Report.

To learn first hand what the Council — the Division's board of directors — has done for you, the member, and for the furtherance of our hobby, attend in person at the AGM.

The AGM will also see presentations being made, including the Harry Kinnear Trophy, for contributions to AR magazine, and the perpetual Fox Hunt Trophy.

INTRUDER WATCH CO-ORDINATOR

The job of stimulating and co-ordinating reports

on intruders in the exclusive amateur bands is now in the hands of Philip Pavey VK3BHN.

The important task of Intruder Watch helps the Amateur Radio Service defend and protect its allocations from intrusions by commercial, government and military stations.

All radio amateurs and shortwave listeners are requested to give Philip their support.

He can supply Intruder Watch Report Log Sheets, and general information on how to report, including a list of frequent intruders. Philip Pavey VK3BHN, can be contacted QTHR.

RADIO MASTS

In recognition that the issue of radio masts and local government would be an on-going area of concern, the WIA Victorian Division Council has appointed Rob Hailey VK3XLZ, to the position of Radio Masts Co-ordinator.

The function of this new position has been carried out since 1980 by Alan Noble VK3BHM.

Council notes that there is a growing number of cases where municipal councils resist applications for radio masts, and force their applicant into the appeal process.

The wise thing to do if you are thinking of erecting a mast, is to seek advice first, from the WIA Radio Masts Co-ordinator.

Rob Hailey may be contacted by those seeking advice on how to apply for a permit for a radio mast — his address is PO Box 425, Carnegie, Vic. 3163.

PENSIONER RATES

Some inquiries have been received recently concerning the pensioner rate of membership.

The current policy of the Victorian Division is as follows:

"Recognising that there are a number of members over the age of 65, who are on fixed incomes of about the same level as the full aged pension, the Division will allow persons over the age of 65 to elect to pay either the pensioner rate or the full rate of membership according to their income."

This policy for members aged 65 and over relies on the integrity of those members and the Council expects that the spirit of the policy will be honoured.

Members under the age of 65, who seek to pay the pensioner rate of membership should apply to the Council enclosing a photostat copy of their full pensioner benefit card.

NEW MEMBERS

A warm welcome to the following members who were accepted by Council on February 26, 1987.

Robert Briggs VK3BVS, John Chippendale VK3UO, William Dunkley, Anthony Falla VK3KFP, Colin Gamble VK3AFY, Darren Hilbert, Russell Holdenson, Hans Jost, Brett Leslie VK3PNA, Kevin Nunan, Mark Pinches VK3BXX, Robert Redshaw VK3DRR, Brian Richardson VK3CCR, Roderick Taylor VK3KVR, Bruno Tonizzo VK3NXO, and Karl Walla VK3AUH.

Five-Eighth Wave



160 METRE BROADCAST

An inquiry was made recently as to why our broadcast was in the middle of the "DX Window" since the new agreed band-plan. Discussion at the time that the band-planning was being carried out, brought forward the following points.

That DX on 160 metres was mainly confined to a period around Sunrise and Sunset, known as "Grey-line" times and that, as such, the chances of our broadcast, at 9.00 am, clashing with any possible DX was highly remote and that the higher up the band we go, the harder it is for people to "tweak their transients" with any degree of success. As this is one reason we still use AM, it seems reasonable not to make it any more difficult for those listeners. In VK2, they shifted frequency as their evening broadcast might have interfered with the DX.

Thank you to all those who have taken the trouble to comment on our 160 metre broadcast quality. Yes, we know we have a problem, and new ways of improving matters, particularly with regard to the transmitter and antenna systems, are being looked at.

NEWS FROM DARWIN

A new-look slimmed-down copy of *Groundwave* (the magazine) passed across my desk (as they say in the classics) the other day. I suspect that the new editor, Henry VK8NH, can take some (if not all) of the credit. It is still informative and entertaining reading, but I suspect that, like this Division, they have had to take a long, hard look at the cost of printing and distributing a magazine.

Also, like this Division, they are running a Novice Course with numbers well down this year. I wonder if this trend is the same in other Divisions? Like us, also, they are looking seriously into the development of examinations by DOC. The Club will be celebrating its 21st birthday this year and I'll keep you informed of future activities as they come to hand.

... Just one question fellas, what happened to the piece on Samuel Morse? Mine finished five lines down, in mid-sentence! Perhaps it suffered the same CW and/or tele as the one which was swallowed by the Editor's computer, never to be seen again. Anyway, keep up the good work "up there in the Top End" and keep the *Groundwaves* coming.

DIARY DATES

Tuesday May 26 — Speaker Kevin May VK5IV, *Life, Solar Power and Amateur Radio in Irian Jaya*. Meeting starts at 7.45 pm.

JUBILEE 150 AWARDS (continued)

1205 KJEU	1206 W5WGN
1207 VKSPOT	1208 VK2KEW
1212 VK2PDI	1214 W4WVZ
1215 VK2PTE	1216 VK3BYE
1217 VK4HJM	1218 VK5AOP
1219 VK2FE	1220 VK2CVR
1221 W8ZJG	1222 VK8NAJ
1223 VK2CJH	1224 VK8LFF
1225 W8YF	1226 VK5ZUJ
1227 VK5ZDJ	1228 VK4MIA
1229 VK3NDH	1230 VK2PZX
1231 VK4NCM	1232 VK7FD
1233 VK5WV	1234 VK5KF
1235 VK6BFB	1236 VK4NFP
1237 VK2APJ	1238 VK7NMH
1240 VK2NPX	1241 VK4N8D
1242 VK4NMA	1243 VK5PBC
1244 VK5ZAJ	1245 VS1UJ
1246 VK5KJH	1247 01UAUJ
1249 AH2F (1st AH2)	1250 VK5KDE
1251 VK5NCR	1252 VK3YB
1254 VK8PT	1255 VK4BKM
1256 VK4VC	1259 VK5OR
1265 VK5NT	1266 VK5NGJ
1267 VK5PDL	1271 VK5CDD
1272 A4XJ (1st A4)	1273 A4XKL
1274 YB5AK	1275 G4STZ
1276 VU2LBW	1277 G2ZTAB
1278 YU3HR (1st YU)	1279 YB0BL
1280 1T9TQH (1st IT9)	1281 YC8GH

1282 YZ7AA	1283 SMOLCK
1284 VU2XY	1285 0J8BK
1286 IJ2JL	1287 G4SVB
1288 VU2ACK	1289 G0VFN
1290 CU3AA (1st CU3)	1291 G4PVP
1292 F6GMT	1293 VU2FVR
1294 G4PVP	1295 IZ1U9R
1296 F6ALY (1st F6)	1297 HA4JL (1st HA4)
1298 JE4BR	1299 VK2NNK
1300 HA6NF (1st HA)	1301 9M6M0 (1st 9M6)
1302 G21RK (1st C21)	1303 VU2UJO
1304 W4VY	1305 W5SD
1306 140R	1307 W5FS
1308 9K2RA	1309 W05D
1310 VK2KLS	1311 GAUBH
1312 ZL1AJ	1313 05ECA
1314 HC1RF (1st HC1)	1315 G4QAF
1316 U11 168738 (1st USSR SWL)	

ANARESAT REPLACES HF

A new satellite communications system has ended 30 years of geographic isolation for the people at the Davis Base Australian Antarctic research station.

The Australian National Antarctic Research Expeditions Satellite (ANARESAT) system replaced the previous high frequency radio service — often subject to interruption because of atmospheric conditions — with around-the-clock reliable and high quality voice and data connections.

Australia is the first nation in Antarctica to install, on a permanent basis, state-of-the-art satellite communications to its research stations.

Davis now has faster and more efficient communications to transmit meteorological and scientific data to Australia, and the new links will help ease feelings of isolation at the base.

Satellite earth stations will be installed at the Casey, Mawson, and Macquarie Island bases over the next two years at a cost of \$4 million.



VK4 WIA Notes

Bud Pounsett VK4QY
Box 638, GPO, Brisbane, Qld. 4001

The Gosford Field Day — a Queensland photographic perspective by Peter Hadcraft VK4APD.

BARCFEST '87

The Brisbane Amateur Radio Club extends an invitation to all amateurs to visit BARCFEST '87 on Saturday, May 9, which will be held at the Indooroopilly High School from 9 am to 4 pm. There will be something for all the family — arts and crafts, retail displays, specialist groups, antique wireless and much, much more. Also plenty of disposals.

Disposals paying point.



Stowaway working his passage home.
(Peter VK4NGK).



"What exactly do you do with secondhand computer parts, Haddy?" (Peter VK4APD).



Brian VK4AHD, receiving an offer he could not refuse.



Kevin VK4KGF, pondering his next move.



Mick VK4BMT, sleeping on a good deal.



Jim, Steve, the boys from real-time-land, and the Ballina boys.

NEW AMATEUR RADIO CLUB IN QUEENSLAND

The Central Highlands Amateur Radio Club was formed on the air and its members also hold their meetings on-air. (See Club Corner, March AR). Amateurs from the Central Queensland coalfields area, Moranbah, Clermont, Dysart, Middlemount, Tieri and Glendon, hold their meetings each month on 3.620 MHz at 0700 UTC, on the third Wednesday. Visitors to the club on 3.620 MHz are more than welcome. Members are planning a get-together at a central venue for their Annual General Meetings, so they can see what one another look like!

—Bud Pounsett VK4QY

GOSFORD FIELD DAY — a Queensland perspective

Emtronics arranged for a subsidised bus trip for VK4s to attend the Gosford Hamfest, departing at 5 pm, Saturday, February 21, and returning in the early hours of Monday, February 23, (so the "trippers" would arrive at work on time).

"An enthusiastic team of 11 Queenslanders set off from the Stones Corner Office, with the bus crew of two, Jim and Steve, introducing everybody to the delights of bus travel.

At Ballina, four VK2s joined the group for dinner and continued on to Gosford. Harold VK2CHM, kept the party entertained with lines like: "So there I was with my boots full of Palmolive, in Yokohama harbour" and "You want to try being in a whale-boat with a bunch of Novices and a Harley-Davidson in a rough sea."

Sleeping on the bus was not easy. There was talk of new equipment, an occasional ribald joke, then everyone would lapse into slumber. A couple of hours later, someone would stir, there would be more conversation and the whole cycle would repeat itself. This procedure continued throughout the night.

Another problem was — the bus seats were hungry. They swallowed, in turn, Mark's wallet, David's "rubber ducky" (which he'd taken to bed with him), and most of John's small change.

Next morning, 40 minutes north of Gosford, Harold discovered the batteries in his two-metre hand-held were flat, so the driver turned around and regressed. The entourage managed to convince him to forget about it and pull into a roadside for breakfast instead. (Now, when they tell you, "Here's a chance to have a feed and a shower" always ask how many showers there are! I never did find out how many actually used that one shower in the short time available.)

Arrival time at the Gosford Showgrounds was 6 am real-time (7 am local time) so the bargain hunters wouldn't miss out. Gosford is much like the Gold Coast Hamfest with trade displays,

competitions and a bus trip to view the hinterland. There was a quiz for the intellectuals with questions like:

Who invented the first practical VTR?

Who invented the IC?

and so forth. . .

A big feature of the day is the sale of disposals. All items are tagged by the club committee with price, seller and lot number and laid out on trestles beforehand. At 10 am, the doors are opened to the hordes and it is a free-for-all like a department store's end-of-season sale. The club receives 10 percent of any sale. Unfortunately, if you want to dicker, you have to locate the article's owner first.

Everyone started to get hungry around noon and the hamburger stand did a roaring trade, as the liquid refreshment stand, but a XXXX would have been nice! By 4 pm, real-time, everyone was ready to head back to good-old-Brisbane, expecting a quite sleeping trip home. This was not to be. Only 30 minutes out from the tea stop at Bulahdelah, halfway up Sullivan's Gap, we came upon a truck by the side of the road. Its cabin was well alight with molten plastic dripping on the road and black smoke billowing into the still air.

David VK4ZET, immediately called on the Newcastle 6900 repeater with his two-metre rig and Don's newly acquired 100 watt after-burner. The silence was deafening, so David broke into a conversation on 7100 and VK2AKX replied. A call on the land-line, and the police arrived within 15 minutes. Happily, by this time, the fire seemed to be burning itself out and was no longer licking at the cargo compartment which contained some hypochlorite (pool chlorine).

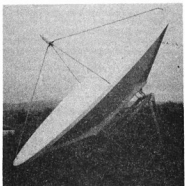
We left and had an otherwise uneventful trip for the rest of the way. All declared it a great day!

—Contributed by Peter Hadgrat VK4APD

ATN ANTENNAS

Unfortunately, a fire at the factory of ATN Antennas has caused considerable damage and production has been severely affected.

SATELLITE



SEMI-PROFESSIONAL RECEIVE ONLY DISHES

FIBREGLASS CONSTRUCTION AVAILABLE IN THE FOLLOWING SIZES

- 140m Offset feed Ku Band
- 180m Prime Focus Ku Band
- 2.65m Prime Focus Ku Band
- 3.00m Prime Focus Ku Band
- 3.30m Prime Focus C Band

Various mounts available for all dishes which are assembled and tested to meet the stringent Ku Band specifications before shipment.

VICSAT also develop, manufacture and supply receiving equipment for American TV and AUSSAT Satellites, Descramblers, Vidiplex Decoders, Wide-band PAL detectors and similar equipment.

Suppliers of Plessy B-MAC Equipment.

Discuss your requirements with Peter VK3CWP at:

VICSAT

9 Maroondah Highway, Croydon, Vic.

3136.

TELEPHONE: (03) 879 1155



Over to You!

SINCERE THANKS

Having upgraded from Novice to AOCOP I wish through the courtesy of AR to express my sincere thanks and gratitude to one to whom many amateurs owe their licence in West Australia.

His dedication to his students is of the highest order. One could regard him with a problem after class, on the phone, or at his residence, where he would gladly assist.

His personality endeared him to all he came in contact with. As a Radio Engineer he was a credit to his profession, also as a teacher he has no peer.

When on considers that students would travel long distances to attend his classes it shows how he was held in this regard.

It will be a sorry day when eventually he has to retire as the teaching profession will lose one of its assets. I refer to Mr David Couch VK6WT.

To you, David, may I offer my sincere thanks and gratitude for your assistance over the years as it has been most appreciated, and last but not least to my wife, Olive. Many thanks for all her hospitality at all times.

Graham Millard VK6GK,
Unit 19,
64 Hastings Street,
Scarborough, WA. 6019.

EX-POWS

Last year, members of the ex-POW Association of Australia held a wonderful reunion on the Gold Coast.

In an effort to retain some of that good fellowship, Tom VK4OD and myself would like to hear from ex-POWs of any theatre who have an amateur licence.

Let us know your operating habits and we will circulate that information so we may meet each other on the air sometimes and perhaps get together at the next reunion?

We look forward to hearing from you.

73.

Peter Brown VK4PJ,
16 Bede Street,
Balmoral, Qld. 4171.

TELEPHONE: (07) 399 2861.

THANKS

Just a short note to thank you for editing and printing the obituary notice for the late Alan Heath VK5ZX, in the February 1987 issue of AR.

I was personally impressed at how the notice read and much was due to the editing. Several have made similar comments to me, including my mother.

Thank you also for returning the photographs.

Yours sincerely and best 73,

Christopher Heath VK5ZZX,
Box 202,
Kapunda, SA. 5373.

THIRD PARTY SOLICITING AND THE ATN AN OPEN LETTER TO DAVID BELL VK2BBT

With reference to your open letter to the Department of Communications in AR of February 1987 concerning Third Party Traffic.

Unfortunately, your letter contains many errors, misconceptions and exhibits a lack of knowledge of the regulations applying to the Amateur Radio Service.

For instance, in sub-paragraph 1: The stated policy of the DOC at the time of the authorisation of Third Party Traffic was and still is that: "Amateurs are not permitted to solicit for Third Party Traffic from the general public."

What happens in the USA does not alter the regulations or departmental policy in this country.

Your statements in sub-paragraph 4 are incorrect. It has been pointed out to your ATN Group

and Sam Voron VK2BVS, several times by other amateurs that you were often in breach of the regulations.

All you had to do was to telephone your nearest District radio inspector and ask some simple questions.

If you were not aware of the regulations or departmental policy regarding Third Party Traffic, then I am sure that gentleman would have explained everything to you, including the fact that the regulations in the current handbook are still in force unless otherwise altered or amended in the new RACOM ACT.

Your complaints in sub-paragraph 2 only confirm what everyone would expect; i.e. that the general public are not interested in having their personal and private business broadcast over radio for all to hear!

Most of the "Hullabaloo" raised by Sam and the ATN about Mexico City was, as pointed out by Syd Molen VK2SG, in AR of October 1986, totally unnecessary as there was direct amateur radio communications on teletype and AMTOR with Mexican amateurs in that city, and these systems were far more efficient and private than that used by the ATN.

Your statements in sub-paragraph 3 and 5 are also incorrect since any amateur interested in emergency communications and in need of training only has to join a WICEN group.

WICEN is still the only amateur radio organisation recognised by the DOC for handling of emergency communications and that includes Third Party Traffic.

Your sincerely,

Ted Gabriel VK4YG,
PO Box 245,
Ravenshoe, Qld. 4872.

The foregoing has been slightly abbreviated. As this topic has now had more than sufficient discussion, no more letters on it will be published for the time being. —Ed.

OBLASTS

The article by VK5BS, concerning USSR call signs mentions the existence of some anomalies in call signs which do not appear in the list given in the article. A full list of USSR amateur call signs with the corresponding oblast names and numbers was published in the 1982-83 WIA Call Book (page 71). This list was translated by myself from an original article in the Russian magazine Radio in 1981.

There have been some minor changes since that time, but, as yet, no updated list has appeared in Radio. Some of the calls such as UK3A, UK3B, UK3F can be found in the 1981 list under Moscow, Oblast number 170 and thus are not really "anomalous", although perhaps no new calls with these letters are being issued. Also, calls such as UA1DZ, UH8DA with two-letter suffixes were issued prior to the present oblast identification system utilising three-letter suffixes, hence it is not possible to identify their oblast location.

Incidentally, all USSR club stations have UK prefixes, the K indicating "kloob" (club), and EZ prefixes are used by fourth category novice stations. R prefixes indicate "ultra-shortwave" stations (28 MHz and above).

73,

Bob Hancock VK5AFZ,
PO Box 361,
Port Elliot, SA. 5212.

NATIONAL PARKS AWARD

I consider the VK3 National Parks Award, named in honour of the late Keith Rogot, one of the best conceived awards available.

As many readers know, it is based on QSOs

with or from National Parks. It is thus an encouragement to mobile or portable operation, as well as bringing amateur radio into interaction with the splendours of unspoiled nature.

However, the stay-at-home can also win the award. One sunny summer, Sunday afternoon called "CQ National Parks" through several two metre repeaters and scored three points towards the award — from stations in the Brisbane Ranges, Grampians and Wilson Promontory National Parks.

I also got some calls from amateurs who thought they were in National Parks, but were in fact in other nature reserves, such as state parks and coastal parks. Only National Parks count.

When the rules for the National Parks Award were drawn up there were 31 such parks in VK3 and you must score QSOs with 16 of them — which is a majority.

However, the award manager now faces problems analogous to those faced by the DXCC custodians with regard to deleted countries and admission of new call sign areas. Last year, the Victorian Government announced that the Organ Pipes National Park would lose its status, and be reclassified as a different kind of nature reserve. Further, three or so new National Parks are due to be proclaimed.

I leave it to the Award Manager to determine the exact date after which the Organ Pipes ceases to count, and the dates on which the new National Parks are accepted for award purposes. Also, if there is a net addition of two new National Parks in 1983, maybe the rules should be changed to make 17 QSOs the qualification.

Life wasn't meant to be easy, as somebody once said.

Cheers, 73,

Ken Goff VK3AUJ,
388 Langford Road,
Saint Kilda, Vic. 3183.

ANOTHER DISCUSSION PAPER

... and heard great argument

About it and about it, but everyone

Came out by that same door as I went."

The Rubalvat. I have studied the great arguments about the future of amateur radio and I have not reached any definite conclusion. I do believe however that all of the following are possibilities.

Every individual amateur will continue to enjoy amateur radio in the way she or he prefers and all of those people in a position to influence the course of amateur radio will concentrate their effort on protecting the freedom of radio amateurs to enjoy amateur radio in the way they prefer.

WIA office bearers will not prejudice that freedom by acting as mere "yes men" to officialdom. They will support each other and every member with a grievance and do their utmost to obtain redress of each and every grievance.

All radio amateurs will oppose the present "conventional wisdom" which favours de-regulation because when a government and its public service surrender the regulation of the usage of a natural resource it is reacting to pressure from self-interested parties who want to exploit the resource for profit. Governments rarely if ever originate an idea.

Members of the amateur service will abandon their attempts to convince the community that there is value in retaining the service because of its usefulness as a stand-by communication service, and will concentrate on selling the innovative potential in self education and technical investigation.

Governments and the ITU will withdraw support of the amateur service and reclaim the amateur bands for other purposes because the primary purpose — "Self education, technical investigation and communication with other amateurs" can no longer be justified.

Amateur experimenters and amateur communicators will have to purchase spectrum space or time slots in spectrum allocations owned or leased by private organisations. The cost; 'market value.' The amateur service will be 'self regulated' is controlled by organisations such as the WIA, which will decide eligibility for entry and police performance according to its own by-laws.

The consequence of 'self regulation' will be a rebellion against the by-laws and a return to 'poaching' such as occurred on the 11 metre band. Conflict will be resolved by a return to common sense and the present happy situation; which is just outside the borders of anarchy, which is how it should be.

Readers will be disappointed if this verbiage doesn't and with a quotation, here is a sample quotation from an address by a senior UK public servant.

"Any moment it (the radio spectrum) stands unused because of regulatory constraints when somebody could be using it is an opportunity wasted — an opportunity cost or loss that makes the community that much poorer."

We must convince the community that the wasted opportunity for profit in the amateur service is a worthwhile cost.

Lindsay (Stirrer) Lawless VK3ANJ,
Box 112,
Lakes Entrance, Vic. 3939.

THE PROBLEM WITH DIGIPEATERS

by Tom Clark W3WIV

I am sitting here in the shack feeling very frustrated. I am watching the activity on 145.010 (although the problem is just as severe on 145.050 or any of the other frequencies in use in the area) watching WA4Xxx tying up the frequency for the greater portions of Northern VA, MD, WVA and EPA, trying to connect with a BBS in Pittsburgh using SIX(X) digipeaters. He is having no luck and undoubtedly is wondering why. The basic answer is very simple: Packet radio doesn't work through more than two or three digis! I

Oh yes, I hear you saying "You are wrong — the AX.25 protocol permits me to use up to eight digis!" That is a true statement, but just because something is permitted doesn't mean it will work. And here is why —

Assume that you are station ABC at one end of a long string of digis trying to send out a packet through digis DEF, GHI, JKL, MNO, PQR, STU and addressed to station XYZ (fake calls are used to protect the guilty). Thus your intended path is expressed by the following connect command

CONNECT XYZ VIA

DEF, GHI, JKL, MNO, PQR, STU

Your outgoing packet then should take the path ABC > DEF > GHI > JKL > MNO > PQR > STU > XYZ

At every step along the way, there is a finite chance that the packet is going to be hit by QRM. My observations are that on the very best paths about five percent of packets get clobbered on any single hop. For the example we are using, this means that 95 percent of the ABC > DEF packets make it to DEF, and then 95 percent of them successfully navigate the DEF > GHI path, and so forth. Thus at the destination XYZ we have

.95 * .95 * .95 * .95 * .95 * .95 = .70

Only 70 percent of the data you send out makes it all the way to XYZ.

But wait — there's more! ! !

AX.25 packet protocols require XYZ to send you back an "ack" (acknowledgment) packet which then has to unwind itself back through the same route. The same probability arguments apply and 70 percent of the acks get to you. Thus on a high-quality 95 percent link through six digis, only .7 * .7 = .49 of your packets are successful through six digipeaters! A Las Vegas gambler could make a very good living on 51/49 guaranteed odds.

But wait — there's more! ! !

We took 95 percent as the probability of each link working. I know of very few paths that are that good except perhaps at 4 am when nobody else is on the frequency. Links you tend to think of as "pretty good" probably have 10-20 percent of your packets trashed on any given hop. And I know of a number of links where the probabilities are no better than 50 percent. For the general case, if P is the link probability on all links, and N digipeaters are involved, then PA = the aggregate probability of success will be given by the formula

PA = (P)^N (2N+2)

But wait — there's more! ! !

Every time your packet gets clobbered, you try again to push it through. If 50 percent of your packets get hit, on average you will try forty times for each packet two times. In general the number of tries/reties that will be required is

TRIES = 1/P

But wait — there's more! ! !

You and everybody else who is on packet sent a lot of money to be able to ragchew and send messages (or data, or nude pictures, or ???) at 1200 baud. But the packet gurus lied to you. Your data doesn't really fly at 1200 baud — there is some overhead associated with headers that are appended to each and every packet you send, plus some time wasted in getting that all important ack back, plus some time for your radio to change from transmit to receive and back to transmit, plus time waiting for a hole to open up on the channel.

At best you can transmit say 600 baud. But for every digipeater you use, another set of similar delays is added at each step along the way. So if you had a perfect set of links through N digis, your average baud rate would drop to something like

DIGIPEATED BAUD RATE = 600 / (1 + N)

But wait — there's more! ! !

Each time your packet gets clobbered, it is retried, until it gets through (or until you time out). So the real effective baud rate is slowed even further until it is given by this formula

EFFECTIVE BAUD RATE = 600 * PA / (1 + N)
= 600 * ((P)^N (2N+2)) / (1 + N)

But wait — there's more! ! !

Every time you take over the channel with an unsuccessful packet, somewhere along the chain you have prevented some other hapless individual from using that time slot

FROM HAVE HOGGED THE FREQUENCY!

We might express you channel usage efficiency as the ratio of the baud rate that you actually achieved to the baud rate you would have achieved if you had simply used a piece of wire, i.e.

EFFICIENCY = EFFECTIVE BAUD RATE / 1200

More instructive than seeing this factor as a simple numerical ratio is to express it in dB as what I like to call the "Hog Factor"

HOG FACTOR = 10 log (EFFECTIVE BAUD RATE / 1200)

This factor even includes the 3 dB "loss" for a perfect AX.25 link due to the overhead we discussed earlier.

But wait — there's more! ! !

So far I have only used a few numbers to introduce the concepts. The accompanying four tables tell the whole story. I have worked out a number of cases for links ranging from perfect (P=1.0) to pretty snafu (P=0.5) and from 0 through eight digipeaters. My experience shows that P=0.95 is a pretty rare case, but outside of "prime-time" hours P=0.90 is fairly typical. In the evenings when everybody is on the channel P=0.80 is not unusual. Paths involving "DX" digipeaters (like K3LZ1 or WB4APR-6 or WA4FRB-3) degrade to P=0.8 or P=0.7 in the evenings simply because they hear so much stuff. And we always have the user in a poor location, running an HT with a rubber duckie who is lucky to have P=0.5!

My advice to all users is that they not even attempt to use a path with which P < 0.5 (or on average > 2 tries/reties). I have put those "bad" combinations in parentheses to highlight them. Unless you have an exceptional path (better than P=0.95), these tables clearly show that using more than one or two digipeaters is an exercise in futility which will make you very unpopular with your peers ("Hog Factor" poorer than -10 dB) and drive you to distraction (with effective baud rates slower than about 100 baud). Have I proven my premise from the start of this tome?

Packet Radio Doesn't Work Thru More

Than 2 or 3 Digis! ! !

—From Amateur Satellite Report, Number 141, January, 1986

—Contributed by W1 Scott VK4XP

Link Success Probabilities Per Hop

N =		P=1.0	P=.95	P=.90	P=.85	P=.80	P=.70	P=.60	P=.50		
PA = Aggregate Probability of Success											
No of Digis											Equivalent System Baud Rate
0	1.0	0.90	0.81	0.72	0.64	(0.49)	(0.36)	(0.25)	0	600	542
1	1.0	0.81	0.66	0.52	(0.41)	(0.24)	(0.13)	(0.06)	1	444	486
2	1.0	0.74	0.53	(0.38)	(0.28)	(0.12)	(0.05)	(0.02)	2	300	244
3	1.0	0.66	(0.43)	(0.27)	(0.17)	(0.06)	(0.02)	(0.00)	3	200	147
4	1.0	0.60	(0.36)	(0.20)	(0.11)	(0.03)	(0.01)	(0.00)	4	120	106
5	1.0	0.54	(0.28)	(0.14)	(0.07)	(0.01)	(0.00)	(0.00)	5	72	52
6	1.0	(0.49)	(0.23)	(0.10)	(0.04)	(0.01)	(0.00)	(0.00)	6	42	28
7	1.0	(0.44)	(0.19)	(0.07)	(0.03)	(0.00)	(0.00)	(0.00)	7	24	14
8	1.0	(0.40)	(0.15)	(0.05)	(0.02)	(0.00)	(0.00)	(0.00)	8	14	8
											Channel "Hog Factor" in dB
0	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	
1	1.0	1.2	1.5	1.9	(2.4)	(4.2)	(7.7)	(16)	2	-3	-4
2	1.0	1.4	1.9	(2.7)	(3.8)	(8.3)	(21)	(64)	3	-6	-7
3	1.0	1.5	(2.3)	(3.7)	(6.0)	(17)	(56)	(160)	4	-9	-10
4	1.0	1.7	(2.9)	(5.1)	(9.3)	(35)	(165)	(1024)	5	-11	-13
5	1.0	1.9	(3.5)	(7.0)	(15)	(72)	(459)	(4096)	6	-13	-16
6	1.0	(2.1)	(4.4)	(10)	(24)	(147)	(1176)	(16254)	7	-15	-20
7	1.0	(2.3)	(5.4)	(13)	(36)	(301)	(3545)	(65353)	8	-17	-23
8	1.0	(2.5)	(6.7)	(19)	(56)	(614)	(9848)	(262144)	9	-19	-25

Silent Keys

It is with deep regret we record the passing of —

MR J R BERRY VK2BOD
MR W J GOW VK5NOF
MR K H MCINTOSH VK2BIZ

Obituaries

WILLIAM (BILL) DEAGUE VK2BBN
After a long period of ill-health, Bill — a true Officer and Gentleman — passed away in early February.

Bill saw service in the RAAF over the war years, and then, as a result of a road accident, had spent many years in and operating from a wheelchair.

He came to Sydney from Brisbane and it was my pleasure to have had a number of contacts with Bill. His Victorian and Queensland contacts were of great interest to him, and he always could be relied upon for a contact whenever I was operating mobile from different locations.

Bill thoroughly enjoyed amateur radio and did marvelously well considering his handicaps due to medical conditions.

A true friend, he will be sadly missed. Deepest sympathy is extended to his family.

Gordon Lanyon VK2AGL, *ar*

ALFRED CLAUDE GOVER VK4NAD
Alf Gover was born on January 23, 1922. During the war he served in the RAAF as a Wireless Operator. Whilst serving in the islands, like many others, he suffered from Malaria. Neither the interest in radio nor the after effects of the Malaria ever completely left him. He retained a strong interest in CW and in radio generally.

A French Polisher by trade, Alf sat for the NAOCOP on March 4, 1983, and received the call sign VK4NAD. A member of the Brisbane North Radio Club, he was prevented from regular attendance at meetings by deteriorating health, but was often heard on the club net, and more frequently by club members and others on the CW end of the band. A keen sense of humour made a QSO with Alf a rewarding experience.

Alf's wife, Audrey, found time to study radio also, and in August 1986, they intended to sit for the DOC examinations — Alf for his full call and Audrey the Novice, in the hope of carrying on the VK4NAD call sign. Health problems however, intervened and the opportunity was lost and Alf became a Silent Key on December 22, 1986.

The story does not end there, Audrey is studying again for the NAOCOP and hopes to pass the examination within the two years that DOC will hold the call sign. If you hear this call, (probably on CW), please give her a call in memory of Alf.

John Rahmann, President, Brisbane North Radio Club *ar*

BOB JORDAN VK7IL

It is sad to record the passing of Bob Jordan VK7IL on March 9, aged 88 years. Bob was a WWI Returned Soldier and passed away at Royal Hobart Hospital after being transferred from King Island District Hospital following a short illness.

One of Bob's greatest memories was when, as a young man, he witnessed Marconi's set-up at Port Lonsdale for the first communication to Tasmania. From this, his interest in radio grew.

He received his first call sign, VK3IL, around 1938, an active with this call sign until 1944, when he moved to Currie and became VK7IL.

Bob was a Lighthouse Keeper on Gabo Island when he first became licensed and he used batteries for power to run an old valve unit.

He was also stationed at Cape Everard, Cape Otway, and Cape Schank prior to moving to Currie, King Island, where he remained after he retired in 1963.

Bob is survived by his wife, Elsie, children Bob VK7JRL, Lawry VK2ALV, Jack, Ena, Pat and Janet, 13 grandchildren and 22 great-grandchildren.

Elva and Bob Jordan VK7JR *ar*

BOB SMITH VK2AWD/VK2ERR

Bob VK2AWD, and more recently VK2ERR, passed away on December 30, 1986.

For the past 12 years, Bob was a resident of the Barouerka Caravan Park, Fingal Bay, where he kept in regular touch with his old mates from his shack in the van. He had, in latter years, taken a great interest in computers and was a regular source of information at the Nelson Bay Computer Group.

Most old timers will remember Bob as one of the unsung heroes of the disastrous floods which hit Wagga Wagga in the late 1950s. Using his amateur radio skills he kept the town in touch with the outside world for 10 days, almost without a break. He was highly praised for his endurance by the then Governor General, but he modestly declined the offer of an Imperial Honour. In his own quiet way, Bob was one of those who encouraged the young and constantly upheld the best traditions of amateur radio.

Bob was only 68 when he died and he leaves his wife, Marion and two children and their extended families. He will be greatly missed by all who knew him and valued his friendship, both on and off the air.

—Les Daniels VK2AXZ *ar*

ROBERT AMOS BLYTH VK2BOB

Having spent most of his life in the Belmont area, it is understandable that Bob Blyth VK2BOB/ZL1BKO would be known as "Belmont Bob." When he came on the air in the early 1960s, the name spread far and wide, as did Bob's reputation for good humour and a ready, helpful hand to all. It came as a terrible shock when, on March 3, he died, aged 65, from a heart attack. The greatest tragedy was that, only six days earlier, he had returned to retire in Australia from New Zealand, where he had worked for almost 15 years. His long-planned rest and reunion with family and friends was so short.

Belmont Bob was an intensely practical man. He was a wizard with radio and an expert CW operator. Born in Prestonpans, Scotland on August 24, 1921, he came to Australia as a boy of five.

Bob always worked hard and was an entirely self-made man. In 1962, he decided to try for the AOCF. As always, his approach was thorough and he arranged classes in his garage at Government Road, Belmont. Those who attended formed the core of the soon to be established Westlakes Radio Club. Founder member, Bob, was one of the first Morse instructors. When, in 1972, he left Australia to take up a post with Allied Electronics in Auckland, he kept his links with Westlakes and still retained his VK call sign.

Belmont Bob is survived by his brothers, Peter and Arch, sister Effie, daughter Sandra, son Robert and their families. Those who came to know him through

amateur radio will remember him as a true friend, the like of whom they may not find again. We mourn his passing like that of a brother.

—Keith Howard VK2AKX *ar*

Solar Geophysical Summary

JANUARY 1987

Solar activity was low, with no energetic flares being observed. Despite the low solar activity, there were a number of small sunspot regions visible on the solar disk for much of the month. The sun was not sunspotted only during the periods 8-13, 16 and 30.

The value of the 10 cm flux ranged between 70 (9-11), with a high of 76 (22).

The regions visible on the sun during the month were a mixture of old cycle and new cycle regions.

The month was extremely quiet in the terms of the number of geomagnetic disturbances. Only on January 1, did the A index climb above 15 to reach a value of 17. The second most disturbed day was the 20th, when the A index was only 14.

Monthly averaged A index was seven, probably the lowest since the last solar minimum period, 1976-7.

1986 MONTHLY VALUES

1/86	73.5	2.3	13.9	11.5
2/86	83.9	23.6	13.2	23.4
3/86	77.1	15.7	13.1	11.1
4/86	75.2	20.4	13.8	7.3
5/86	72.7	13.1	14.5	11.1
6/86	67.5	0.8	13.9	9.3
7/86	70.3	17.8	13.8	8.9
8/86	68.6	7.4		12.8
9/86	68.7	3.9		14.6
10/86	83.0	35.7		9.0
11/86	77.3	14.7		10.0
12/86	72.6	6.4		7.5
1/87	72.6	9.8		7.0

—From data supplied by the Department of Science IPS Radio and Space Services, January 1987 *ar*

MORSEWORK 2 SOLUTION

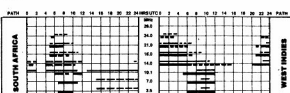
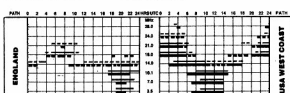
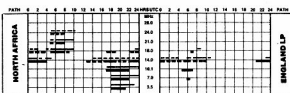
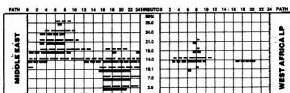
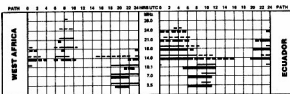
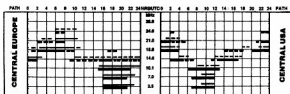
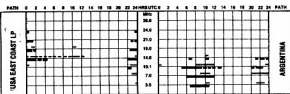
Across: 1 fire 2 sweat 3 cart 4 fire 5 orb 6 lama 7 mines 8 Turk 9 pay 10 ripe

Down: 1 urge 2 boat 3 eager 4 hire 5 rents 6 wing 7 swim 8 back 9 ensue 10 pap

	1	2	3	4	5	6	7	8	9	10
1
2
3
4
5
6
7
8
9
10

Ionospheric Predictions

Len Poynter VK3BYE
14 Esther Court, Fawkner, Vic. 3060



LEGEND
 From Western Australia (Perth)
 From Eastern Australia (Canberra)
 Mixed mode dependent on angle of radiation (long broken line).

Better than 50% of the month, but not every day continuous lines
 All paths unless otherwise indicated; (S LP = Long Path) are Short Path.

Less than 50% of the month short broken lines.
 Predictions are presented courtesy of the Department of Science, IPS Radio and Space Services, Sydney.

DEADLINE

All copy for inclusion in the July 1987 issue of *Amateur Radio*, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9 am, May 22, 1987.

"DX? — DX? ! — All I can raise is the wife on the intercom!!" —VK2COP

Hamads

PLEASE NOTE. If you are advertising items FOR SALE and WANTED please write each on a separate sheet of paper, and include all details: eg Name, Address, Telephone Number, on both sheets. Please write copy for your Hamad as clearly as possible. *Please do not use scraps of paper.*

- Please remember your STD code with telephone numbers
- Eight lines free to all WIA members. \$9.00 per 10 words minimum for non-members
- Copy in typescript, or block letters — double-spaced to Box 300, Caulfield South, Vic. 3162
- Repeats may be charged at full rates
- QTH/r means address is correct as set out in the WIA current Call Book
- Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.
- Conditions for commercial advertising are as follows: \$22.50 for four lines, plus \$2.00 per line (or part thereof)
- Minimum charge — \$22.50 pre-payable
- Copy is required by the Deadline as indicated on page 1 of each issue.

TRADE ADS

AMIDON FERROMAGNETIC CORES: Large range for all receiver and Transmitting Applications. For data and price list send 105 x 220 mm SASE to: RJ & US IMPORTS, Box 157, Mortdale, NSW. 2223. CLOSED DURING JUNE (No inquiries at office... 11 Macken Street, Oakley). Agencies at: Geoff Wood Electronics, Lane Cove, NSW. Webb Electronics, Albany, NSW. Truscott Electronics, Croydon, Vic. Wills Trading Co. Perth, WA. Electronic Components, Fishwick, Plaza, ACT.

EXCHANGE — NSW

APPLE II LOOK-A-LIKE COMPUTER: green screen monitor 64k memory 80 column & RS232 card, joystick, manual & software. Exchange for station equipment or sale. Mervyn Beamish VK2PEH, Ph.(02) 80 2045.

MFU ATU: 30-300V 4 aerial terminals SWR-Power meter. Swap for Bencher type keyer or similar. Also consider semi-auto bug type. VK2CT, Ph.(02) 76 2696.

WANTED — NSW

ELECTRONIC KEYER: Ten-Tec type 670 (Ten-Tec only). Antenna tuner Ten-Tec (only) with 2-gang capacitor internal as in earlier types. VK2KSD, QTHR, Ph.(02) 456 1577.

CHART RECORDER: any type, as long as it is working or easily repairable, and paper is still available. John VK2DWW, QTHR, Ph.(02) 57 6567 AH.

FC-707 ANTENNA COUPLER: FV-707DM Digi VFO. Frequency counter rate model, no kits please. Valge VFO. Data & reference books on ICs, transistors, P.L.T. chips, late model 35 MHz dual beam CROs. Items would have h/books & be in 1st class cond. A Walsh L20181, QTHR, Ph.(048) 51 2092.

MACROTRONICS M650: RTTY/SSB/VICW Pol interface manual & software. All expenses paid. Mervyn Beamish VK2PEH, Ph.(02) 80 2045.

THE BEAM: Also Cuschrack 14711 beam. Also 2m sampler for Oskorbok SWR, VK2AVS, QTHR, Ph.(068) 72 2462.

VALVES: 813 with sockets & 5146B. Phone (02) 29 1768 BH or (02) 498 2259 evenings.

YAESU FT-2070 HF SSB TCVR: & manual. Reasonable price paid for good unit. VK2DC, QTHR, Ph.(047) 39 2782.

WANTED — VIC

14AVO VERTICAL ANTENNA: or similar. Must be in good working condition. Ron VK3QTH, QTHR, Ph.(03) 598 4504.

BITS & PIECES: circuit information or any other material on Icom Digi VFO, DV21. Alternatively, complete unit working or not working. Circuit diagram & for manual for Marconi UHF sig gen, model TF 1050. Will pay cash, postage, etc. Roy VK3AOH, QTHR, Ph.(03) 48 8462.

CIRCUIT, HANDBOOK OR COPIES: for IC-346R rx. Also, wave-change knob. Copy of surplus radio conversions, Volume 1. Ken VK3ZFI, QTHR, Ph.(03) 580 5347.

CRYSTALS FOR FT-75B: QW section of the bands preferred. Vic. VK3DND, QTHR, Ph.(051) 57 0236.

INFORMATION ON REPAIRS TO: Wireless Set No 82 Mk II. (JA 30714 PC No 91217). Operates from 1.6-4 MHz & 1-10 MHz. Please contact Jaime, Wednesdays to Sundays after 8.30 pm on (03) 45 4281 or write to 1 Mossman Drive, Heidelberg, Vic. 3084.

LOAN OF SERVICE MANUAL: for TR2400. Needed to locate broken PCB inter-connecting wires, etc. Will pay as costs & return. VK3BJO, QTHR, Ph.(058) 52 1147.

SERVICE MANUAL: also circuit diagram for BWD501 oscilloscope & also for 811A valves. Ph.(03) 726 7137.

WANTED — QLD

FRB-707 RELAY BOX: Also 6m resonator for Yaesu mobile antenna system (RSL 145). Please contact VK4KHQ QTHR, Ph.(077) 43 4508.

HALLICRAFTERS MODEL HA-10: LF/HF tuner (matches SX117 Rx). Any condition. SX117 Rx for spare parts. Manual or circuit (at least) for Hallcrafters 540A (any model). Sweep generator (Advance or similar) providing for centre fr. freq. of 50.75, 450-500, 1600-1700 kHz, 6.0-6.5 MHz & higher. (Don't mind fixing). L40017, QTHR, Ph.(077) 399 5785 or 40 Quirinal Crescent, Seven Hills, Qld. 4170.

RCA TX TUBE MANUAL: IC-PM2 remote controller for IC-211, high voltage filter capacitors 5-6 kV working. Any obsolete broadcast station equipment inc. car machines, audio consoles, etc. Large ceramic or glass tx tubes suitable for Elapack circuit diagram for broadcast 1-10-50 kW using PDM (Harris) system of modulation. All costs refunded. David VK4GBB, Ph.(077) 892 1631 or 222 4332 or PO Box 275, Booval, Qld. 4304.

RF AMPLIFIERS: 0-2 amp, 0-1 amp, 0-0.5 amp. Contact Len VK4JZ, QTHR, Ph.(077) 398 2002 AH.

FOR SALE — NSW

AMT-1: AMTOR, RTTY, CW Terminal Unit. Commo-

adore 64 computer, C2N cassette, ICS EPROM software for AMTOR-RTTY-CW & auto unattended AMTOR, RS232 interface. \$550. Hitachi green screen VDU. \$100. Seikosha GP100VC print with approx 1000 sheets fan-fold. \$225. Kenwood SP930 loudspeaker with 3 audio filters. \$60. George VK2EZA, Ph.(047) 30 1666.

COAX CABLE: similar to RG213 only better. Same physical dimensions, double screened, single centre conductor. Some long lengths available. Adrian VK2ALE, Ph.(0648) 23 112 BH, (0648) 24 338 AH.

COMMUNICATIONS RX: National Panasonic DR48, RF 4800B. As new. \$400. Info-Tec 3000 keyboard. \$490. Info-Tec M200F only rx converter. As new, imported from USA. Top level Hi-Tec equipment. \$680. Kenwood TS550S & DGS display. Looks & performs as new. Good with mic & built in speakers. A bargain at \$600. Ph.(02) 958 5412.

FT-200B TCVR: with mic, handbook, H/B PS. Excellent cond. No mods. Some spare parts. \$200 ONO. VK2ALZ, QTHR, Ph.(069) 47 2198.

FT-757QX GENERAL COVERAGE TCVR: orig packing, manual & m/c. Part exchange considered. \$1100 ONO. VK2EVB, QTHR, Ph.(066) 52 7160.

ICOM IC-94A UHF HAND-HELD TCVR: mint cond. \$400. ICOM IC-94L HF line-up. amp. New. new stock. \$2200. Peter VK2CIM, QTHR, Ph.(060) 25 4066 AH) 25 1843.

ICOM IC-225 2M TCVR: Fitted with pack freqs. Good cond with digi readout. \$225. Dave VK2FKF, Ph.(043) 67 6629.

IC-720A, ALL-BAND, ALL-MODE HF TCVR: Top condition. \$750. Tona-7577, RTTY, AMTOR, CW, etc new, box never opened. \$500. Alec Dan VK2ABU Ph.(02) 212 3833, (02) 328 1261 AH.

KENWOOD TS-430S HF TCVR: with PS-430 power supply, CW narrow & AM filters, FM board, MC425 scan mic, DC lead, manual, flawless cond. Suit new buyer. \$1450. Max VK2GE, QTHR, Ph.(043) 92 4950.

MICROWAVE MODULES: 2m/70 cm transverter + 30W home-brew linear. \$200. 2m to 10m rx converter (VK3AFQ design). \$60. Yaesu YD14B desk mic, selectable impedance, suits all Yaesu rigs, \$35. EPROM programmer, ET1168. Suits Microbe, c/w cable & 2IF socket. \$40. David VK2DXP Ph.(046) 54 1473 AH.

MULTI 7 2M FM TCVR: 12 channels fitted. \$140. VK2DC, QTHR, Ph.(047) 39 2782.

SATELLITE AURAL CONTROLLER PCB: as per AMSAT-Aust newsletter 22 Jan 87. Paperwork includes instructions, circuit, PCB layout & parts list. Send \$20 + \$15 p&p. VZ-200/300 RTTY-CW interface, adjustable. \$99. Band. 170-850 kHz shift, 5-99 WPM CW. Paperwork incl instr, circuit, PCB layout, PCB & parts list + free software. Send \$20 + \$15 p&p plus good quality C10 cassette for add \$2 for cassette). Rudy VK2XMF, QTHR.

STEEL TOWER: triangular girder construction. 17m in three sections. \$120 ONO. Maurice VK2DJD, QTHR, Ph.(02) 605 9127 (Home) (02) 708 9487 BH).

TRIBAND HF BEAM: Th3. Swan 10-80m swr. Digital B1 P/SP speaker. \$250. Demonstrate on air. VK2AVS, QTHR, Ph.(068) 72 2462.

TS-820: good condition \$500 ONO. Auto antenna tuner. Diawa CNA1001, 500W PEP cross needle power SWR meter. Good condition. \$280 ONO. VK2KXX, Ph.(02) 918 8147.

YAESU 2M HF FT207R: Case, nickel, additional antennas, 12V charging cradle, + PK. \$260 (incl insur post). VK2KSD, QTHR, Ph.(056) 157 1577.

FOR SALE — VIC

ALUMINIUM TUBING: 18" ID 16" OD. 300 ft to 33". As new. Multiband ant. 80, 40, 20, 15, 20m. Side hit cut. Slotted ribbon, 2m 75 ohm coax, 1/2 ball, will explain CCT & details. Ring after 5 pm & wk ends. \$50. VK3JFT, QTHR, Ph.(03) 882 4853.

AMATEUR TRAP VERTICAL ANTENNA: Hi Gain 14 AVO, covers 40V metres. Excellent order with full instruction manual. \$80. John VK3ZAB, Ph.(03) 232 4212.

BEAM: 20m full size beam, Hy Gain TH8DX, Jaybeam 10 ft 2m beam, Diawa rotator/control box. \$180 the lot. Inquiries VK3JL, Ph.(842 8822) BH 715 1164 AH.

HYGAIN TH3MK3 10, 15, 20M VAGI: with BN66 beam, manual & stainless steel hardware. Good condition. \$250. VK3BCY, QTHR, Ph.(03) 438 3393.

ICOM 735 HF MOBILE/BASE RIG: Brand new in carton. Full warranty. New price \$1769 — sell \$1200. Unwanted

gift. Can arrange freight. VK3EW, PO Box 208, Ringwood, Vic. 3134. Ph.(03) 616 4485 BH).

NALLY CRANK-UP/TILT-OVER TOWER: excellent condition. Will discuss price & method of disposal with those interested. Also, Chirnside C635DX (6m boom) 3 el triband Yagi. Excellent condition. \$240. Ron VK3QP, QTHR, Ph.(03) 598 4504.

POWER/SWR METER: Swan WM180, 5W 50W 500W & 1500W ranges, peak & average readings. 2 to 50 MHz. \$65. Helay PEP wattmeter, LCD display, 500W, 1.5 to 30 MHz. \$55. VK3ARZ, Ph.(03) 584 3512.

REALISTIC DX400 PORTABLE HF RX: 150 kHz-29.999 MHz. AM, SSB, FM broadcast, 2 scan speeds & memory LCD display — Analogue S/S meter. VGC. \$300. Microcota Antenna Digi Multimeter. LCD display — auto shut-off. 10 Mohm input. Folding screen. VGC \$100. John Abram L30475, 11 Halpin Crescent, Shepparton, Vic. 3630. Ph.(058) 21 0846.

RTTY GEAR: Tono 7000E Commo Computer + Tono MTR-D10 \$600. Tono MTR-D10 MTR-D10 MTR-D10 MTR-D10 part \$475. All part cond. Extra RTTY info books incl. Jobby Drills, Frost Aust. Set No M-3, High Speed Steel, 1-13 x 0.5 mm. New \$45. Drill grinding attachment ETC, cap 3-19 mm, new \$25. Converter 2m, Parkes Model 14-1, GC \$50. 1295/82 MHz converter, VHF Assoc Model EXP. GC \$60. Valves 4x150A (2) new \$25 ea. Megacycle Meter & power supply, 420-430 MHz, consist of Model 590 VHR unit & power supply, 240V to 50 cycle, can be used on a multiplier of measurements at UHF PC \$150. 432 MHz Parkes preamp. Model 432-3P \$30. Marshall II power control unit for electric train set. Fair cond. Best offer. VK3BRE, QTHR, Ph.(055) 62 6016.

TONO 7000E COMMUNICATION COMPUTER: Rec & send Morse & RTTY, no interface required, connects direct to radio. \$725. John VK3BL, QTHR, Ph. 762 2119.

YAESU FT-707: in as new cond. Complete with manual, VARC bands. \$700. Later model costs about \$1600. Ken hand-held 2m, 6 channels. Xias on Trt 2-4-8 & 3 simplex channels. Nicads & charger. Good order & it works very well. \$80. Kyoritsu SWR meter. \$30. Keith VK3SS, Ph. 47 2265.

FOR SALE — QLD

SIGNAL GENERATORS: Hewlett Packard 608D 10/420 MHz. Marconi TF1444HA Standard 10/772 MHz. \$150. Marconi 831H Standard 15C. ZD00793 85K/32 MHz. AM/FM \$75. Ratcliffe D205 45/180 MHz \$75. Gertson FM3-500 Freq meter. AM/FM 20/1000 MHz \$75. Marconi FM No2 deviation meter 2.5/100 MHz \$75. Ratcliffe FM1 meter 100/250 MHz \$75. Hewlett Packard 2553B solid state 50/500 MHz converter \$75. Marconi Marconi Sentinel 1004 LF/HF rx \$350. VK4OY, Ph.(07) 398 0886.

FOR SALE — TAS

ICOM IC745 TCVR: with heavy duty power supply PS30 & external spkr. FM, electronic keyer. Xtal marker fitted. As new, only 8 hours use. No mods. Orig packing. \$950. Ian VK3VJ, Ph.(003) 27 2011 AH.

Advertisers' Index

AUSTRIAL ELECTRONICS MONTHLY	55
A J & COMAN	48
BAL ELECTRONIC SERVICES	21
DICK SMITH ELECTRONICS	37
ELECTRONICS TODAY INTERNATIONAL	28
	19 & 56
EMTRONICS	18
GFS ELECTRONIC IMPORTS	56
IAN J TRUSCOTT'S ELECTRONIC WORLD	20
	20
KENWOOD ELECTRONICS AUSTRALIA PTY LTD	8C
LOCUS TECHNICAL	1BC
TEGA ELECTRONICS	51
VICSAT	59
WIA MAGPUBS	2, 50 & 54
WIA (NSW DIVISION) NOVICE LICENCE	7
WILLIAM WILLIS & CO PTY LTD	18

KENWOOD

pacesetter in Amateur radio

NEW!

“DX-celence!”

TS-940S

The new TS-940S is a serious radio for the serious operator. Superb interference reduction circuits and high dynamic range receive combine with superior transmitter design to give you no-nonsense, no compromise performance that gets your signals through! The exclusive multi-function LCD sub display graphically illustrates VBT, SSB slope, and other features.

- **100% duty cycle transmitter.** Super efficient cooling system using special air ducting works with the internal heavy-duty power supply to allow continuous transmission at full power output for periods exceeding one hour.
- **Programmable scanning.**
- **Semi or full break-in (GSK) CW.**

- **Low distortion transmitter.** Kenwood's unique transmitter design delivers top "quality Kenwood" sound.
- **Keyboard entry frequency selection.** Operating frequencies may be directly entered into the TS-940S without using the VFO knob.
- **Graphic display of operating features.** Exclusive multi-function LCD sub-display panel shows CW VBT, SSB slope tuning, as well as frequency, time, and AT-940 antenna tuner status.
- **QRM lighting features** Remove "rotten QRM" with the SSB slope tuning, CW VBT, notch filter, AF tune, and CW pitch controls.

- **Built in FM plus SSB, CW, AM, FSK.**
- **High stability, dual digital VFOs.** An optical encoder and the flywheel VFO knob give the TS-940S a positive tuning "feel".
- **40 memory channels.** Mode and frequency may be stored in 4 groups of 10 channels each.
- **General coverage receiver.** Tunes from 150 kHz to 30 MHz.
- **1 year Guarantee.**



KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.
4E WOODCOCK PLACE, LANE COVE, SYDNEY, N.S.W. 2066. Ph. (02) 428 1455.

Further, beware of dealers not listed in this advertisement who are selling Kenwood communications equipment. All Kenwood products offered by them are not supplied by Kenwood Electronics Australia Pty. Ltd. and have no guarantee applicable.

YOUR DEALER BELOW WILL GUARANTEE SATISFACTION

N.S.W.

EMTRONICS — 94 WENTWORTH AVENUE, SYDNEY (02) 211 0886
REG STOCKMAN COMMUNICATIONS — 100 BANCROFT ROAD & SHIRLEY STREET, INVERELL (067) 22 1363
BORNALD COMMUNICATIONS — 51 DENNISON STREET, HAMILTON, NEWCASTLE (049) 69 1999
MACELEC PTY LTD — 99 KENNY STREET, WOLLONGONG (042) 29 1455
E. & K. COMMUNICATIONS — 14 DUTTON STREET, DICKSON, A.C.T. (062) 49 6437
DX ENGINEERING — 150 GRANITE STREET, PORT MACQUARIE (065) 84 9902
FRANK BOUNDY — LISMORE (066) 86 2145

INTERSTATE

INTERSTATE
VIC:

PARAMETERS PTY LTD — 1064 CENTRE ROAD, SOUTH OAKLEIGH (03) 575 0222
EMTRONICS — SHOP 5, 286-294 QUEEN STREET, MELBOURNE (03) 67 8131
BRIAN STANES — 11 MALLSBURY STREET, BALLARAT (053) 38 2806
SUMNER ELECTRONICS — 78 KING STREET, GEORGETOWN (054) 43 1877
HOBBY ELECTRONICS — 477 NELSON ROAD, MT NELSON (052) 23 6751
WARSONS WIRELESS — 72 BRISBANE STREET, HOBART (002) 34 4303
MARINE & COMMUNICATION — 19 CHARLES STREET, LAUNCESTON (003) 31 2711
V.K. ELECTRONICS — 24 MOUNT STREET, BURNIE (004) 31 7753
MITCHELL RADIO CO. — 59 ALBION ROAD, ALBION (07) 57 6600
EMTRONICS — 216 LOGAN ROAD, STONES CORNER, BRISBANE (07) 394 2555
INTERNATIONAL COMMUNICATIONS SYSTEMS PTY LTD — 8 NILE STREET, PORT ADELAIDE (08) 47 3688
W.A.:
WILLIS ELECTRONICS — 165 ALBANY HIGHWAY, VICTORIA PARK (09) 470 1118
BAY RADIO — 22 GRACE STREET, PERTH (09) 451 3561
FORD ELECTRONICS — 209 HANCOCK STREET, DOUBLE VIEW (08) 446 4745

Odds on our favourite handheld transceiver just got smaller.

ANNOUNCING THE NEW

IC- μ 2A

A Pocket-Size Masterpiece. This small, lightweight, ultra-compact handheld transceiver is designed for ultimate ease of operation and convenient portability, but without compromising the traditional high standards of ICOM transceivers. It is only $\frac{1}{2}$ the size of the IC-2A.

Easy Frequency Entry. The thumb-wheel switches of our popular IC-2A handheld have evolved into rocker switches for 1 MHz / 100 kHz / 10 kHz frequency stepping / 5 kHz up-down scanning / memory channel selection.

10 Memory Channels. The IC- μ 2A has a total of 10 programmable memory channels for storage of your favourite repeaters and simplex channels.

Selectable Transmit Offset. Standard duplex split for repeater operation is ± 600 kHz using the rear panel switch. Alternatively, special-purpose frequency splits can be programmed anywhere within the IC- μ 2A's frequency coverage.

Easy-to-Read Display. Operating frequency and memory channel number are displayed on a new Liquid Crystal Display with time delay on/off, soft green illumination for excellent visibility even in dark environments.

Power-Saving Design. Low dissipation circuit design combined with ICOM's special power saver circuitry reduce standby receiver operation power consumption by 75% after 30 seconds in the squelched state, greatly increasing maximum operating time without recharging.

Selectable Power Output. State of the art transmitter design provides selectable power output at 1 W or 100 mW.

Options Available. Options for the IC- μ 2A include the MB-20 belt clip, HS-10 headset-microphone combination, BC-50 Desk Charger, IC-CP1 cigarette lighter cable, IC-BP20, BP21, BP22, BP23, BP24 battery packs and IC-MB16 mobile mounting bracket.



■ **ULTRA-COMPACT DESIGN**

■ **5 kHz FREQUENCY STEPPING**

■ **10 PROGRAMMABLE MEMORIES**

■ **LIQUID CRYSTAL DISPLAY**

■ **POWER SAVER DESIGN**



Please send me details on:
☐ IC- μ 2A ☐ ICOM's full range of communications equipment.
 Sender's details:

Name _____

Address _____

Postcode _____

Phone: (Business) _____ (Home) _____



ICOM[®]

The Frequency of Ideas.

All stated specifications are approximate and subject to change without notice or obligation. ICOM customers should be aware of equipment not purchased at authorized ICOM Australia Agents. This equipment is not covered by our parts and labour warranty.

POST TO: ICOM, 7 DUKE STREET, WINDSOR, VICTORIA 3181,
 OR PHONE (03) 51 2294 OR 529 7582. ICOM 3143